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Reference

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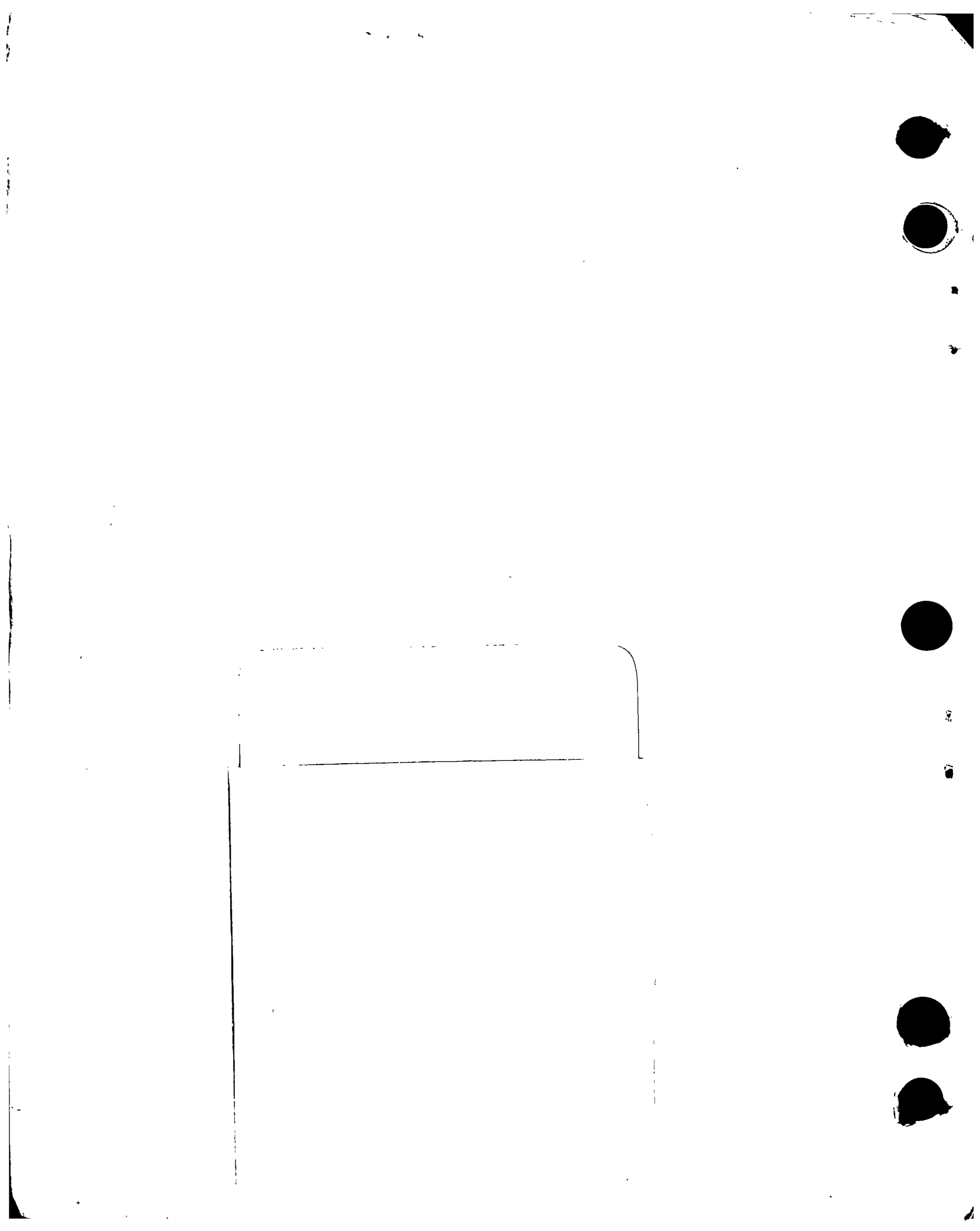
FM 101-20

FIELD MANUAL

**UNITED STATES ARMY
AVIATION PLANNING
MANUAL**

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**HEADQUARTERS, DEPARTMENT OF THE ARMY
MAY 1973**



FOREWORD

This manual is published in accordance with the provisions of AR 95-70 and contains official U.S. Army aviation factors data in a single-source document to be used as a planning guide **ONLY**. The factors, when used with other Army program documents (e.g., Army Materiel Plan and Materiel Annex Part II to 5 Year Force Structure and U.S. Army Aircraft Standard Avionics/Surveillance Configuration, 5 Year Plan Requirement), will assist commanders, planners, and programmers in establishing a basis for operational, logistical, materiel, personnel, estimates, and the cost requirements for combat readiness of all types and models of Army aircraft. In the event such Army program documents, as mentioned above, indicate later revision, such revisions will take precedence. The data may be used in the preparation of estimates by major commands (theater, field army, or equivalent) but will not be used as a basis of reporting cost or other data.

These planning factors were developed from diversified operational and logistical statistical data and were obtained from various Department of the Army staff offices and other Army agencies having primary responsibilities for the specific mission activities or related functions.

This manual is published in looseleaf form to facilitate insertion of revisions, changes, and/or additions. Each set of published planning factors will be revised annually to ensure current and accurate data, as well as provide additional factors of interest. AMC is responsible for coordinating pertinent planning factors with the appropriate Army staff agency.

Users of this manual are encouraged to submit recommended changes or comments to improve the manual. Comments should be keyed to the specific page, paragraph, and line of the text. Reasons should be provided for each comment to ensure understanding and full evaluation. Comments should be forwarded direct to Headquarters, U.S. Army Materiel Command, Research, Development and Engineering Directorate, Attn: AMCRD-F, Washington, D.C., 20315.

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Listed below are all nonstandard abbreviations which do not appear in Military Standard 12C.

SPM	— Shot per minute
SSPI	— Sighting station passive infrared indicator
TOW	— Tube launched, optically tracked, wire command link
DSARC	— Defense Systems Acquisition Review Council

For standard abbreviations, see AR 310-5.

FIELD MANUAL

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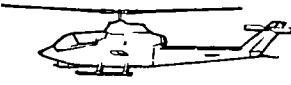
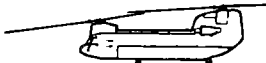
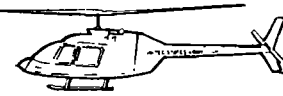
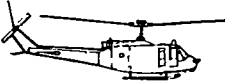
HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 15 May 1973

UNITED STATES ARMY
AVIATION PLANNING MANUAL

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* This manual supersedes (O)FM 101-20-1, 28 September 1971 and (C)FM 101-20-2, 28 September 1971, including all changes.

CLASSES OF ARMY AIRCRAFT

PRE-FERRED	POPULAR NAME AND TYPE	COMBAT ACCEPT SUBST	TRAINING ACCEPT SUBST	LONG-RANGE FOLLOW-ON
AH-1G	COBRA  ATTACK HELICOPTER	UH-1B UH-1C UH-1M		
CH-47	CHINOOK  CARGO TRANSPORT HELICOPTER (MEDIUM LIFT)			LIGHT TACTICAL TRANSPORT SYSTEM
CH-54	TARHE  CARGO TRANSPORT HELICOPTER			HEAVY LIFT HELICOPTER
OH-6A OR OH-58A	CAYUSE  KIOWA  LIGHT OBSERVATION HELICOPTER	OH-13	OH-13	AARS (AERIAL ARMORED RECONNAISSANCE SYSTEM)
UH-1D/H	IROQUOIS  UTILITY (UTILITY/TACTICAL) TRANSPORT HELICOPTER	UH-1B		UTILITY TACTICAL TRANSPORT AIRCRAFT SYSTEM
TH-13T	SIOUX  BASIC INSTRUMENT TRAINER HELICOPTER			OFF-THE-SHELF
TH-55A	OSAGE  PRIMARY TRAINER HELICOPTER			OFF-THE-SHELF

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CLASSES OF ARMY AIRCRAFT

PRE-FERRED	POPULAR NAME AND TYPE	COMBAT ACCEPT SUBST	TRAINING ACCEPT SUBST	LONG-RANGE FOLLOW-ON
U-10A	COURIER  UTILITY STOL AIRPLANE (SPECIAL FORCES AIRCRAFT)			
U-21	UTE  UTILITY AIRPLANE	U-8D/F/G		
OV-1	MOHAWK  OBSERVATION STOL AIRPLANE			MANNED AERIAL VEHICLE/SURVEILLANCE
T-41B	MESCALERO  FLIGHT TRAINER AIRPLANE			OFF-THE-SHELF
T-42A	COCHISE  INSTRUMENT TRAINER AIRPLANE			OFF-THE-SHELF

Army Aircraft Type Classification/Reclassification (TC/R) Schedule (FIXED WING)

TYPE, MODEL SERIES (TMS)	CURRENT TYPE CLASS (CTC)	PROPOSED TC/R	PHASE IN (FY-QTR)	PHASE OUT (FY-QTR)	REPLACEMENT SYSTEM	DA TARGET DATE
O-1G	STD-B	C & T		73-4	OH-6A	JUN 73
U-8D	STD-B					
U-8F	STD-B	C & T		76-4		
U-8G	STD-B					
RU-8D	STD-B					
U-10A	STD-B					
U-21A	STD-A	STD-A	73-3			
U-21F	STD-A					
U-21G	NTC					
RU-21A	DT					
RU-21B	DT					
RU-21C	DT					
RU-21D	LP-U	C & T STD-B	72-4	72-4	OV-1D	
RU-21E	LP-U					
OV-1A	STD-A					
OV-1B	LP-U					
OV-1C	STD-A					
OV-1D	STD-A					
T-41B	STD-B					
T-42A	STD-A					

NTC - NOT TYPE CLASSIFIED

DT - DEVELOPMENTAL SYSTEMS

LP-U - LIMITED PRODUCTION-URGENT

C & T - CONTINGENCY AND TRAINING

SOURCE: AVSCOM (AMSAV-ERT)

Army Aircraft Type Classification/Reclassification (TC/R) Schedule (ROTARY WING)

TYPE, MODEL SERIES (TMS)	CURRENT TYPE CLASS (CTC)	PROPOSED TC/R	PHASE IN (FY-QTR)	PHASE OUT (FY-QTR)	REPLACEMENT SYSTEM	DA TARGET DATE
AH-1G (TH-1G)	STD-A					
CH-47A	STD-A	STD-B		73-2	CH-47C	
CH-47B	STD-B					
CH-47C	LP-U	STD-A	73-2			
CH-54A	STD-A	C & T				
CH-54B	LP-U		72-4			
OH-6A	STD-A					
OH-13S	STD-B	C & T		73-3	OH-58A	
OH-58A	STD-A					
UH-1B	STD-B	C & T		77-4		
UH-1C	STD-B	OB		74-1	UH-1M	SEPT 74
UH-1D	STD-B	OB		74-3	UH-1H	MAR 75
UH-1H	STD-A					
UH-1M	STD-B					
TH-13T	STD-A	C & T		73-3		
TH-55A	STD-A					

LP-U - LIMITED PRODUCTION-URGENT

C & T - CONTINGENCY AND TRAINING

OB - OBSOLETE

SOURCE: AVSCOM (AMSAV-ERT)



CHAPTER 1

OPERATIONS

Section I AIRCRAFT AUTHORIZATIONS

Aircraft authorizations are listed by TOE unit authorizations. The current Major Item Analysis (Data Sheets) contains details concerning authorizations for specific areas or commands.

1-1. Basis of Issue — Aircraft Authorization per Unit.

UNIT		TOE	TOTAL ACFT	LOH	AH-1G	UH-1H	CH-47	CH-54	OV-1B	OV-1C	U-21	U-10
Armored Division	RECAP	17	64	42	9	13						
HHB, Div Arty		6-302	(14)	(14)								
HHC, Armd Bde (3)		17-42	(12)	(12)								
Avn Co, Armd Div		17-87	(10)	(6)		4						
Armd Cav Sqdn	RECAP	17-105	27	10	9	8						
Air Cav Trp		17-108	(27)	(10)	(9)	(8)						
Maint Bn	RECAP	29-35	1			1						
Acft Maint Co		55-424	(1)			(1)						
Mechanized Division	RECAP	37	64	42	9	13						
HHB, Div Arty		6-302	(14)	(14)								
Armd Cav Sqdn	RECAP	17-105	27	10	9	8						
Air Cav Trp		17-108	(27)	(10)	(9)	(8)						
Maint Bn	RECAP	29-25	1			1						
Acft Maint Co		55-424	(1)			(1)						
HHC, Mech Bde (3)		37-42	(12)	(12)								
Avn Co, Mech Div		37-87	(10)	(6)		(4)						
Infantry Division (Active)	RECAP	7	160	62	33	65						
HHB, Div Arty		6-302	(14)	(14)								
HHC, Inf Bde (3)		7-42	(18)	(12)		(6)						
Avn Bn, Inf Div	RECAP	7-75	42	6	6	30						
Aslt Hel Co		7-77	(29)		(6)	(23)						
Avn GS Co		7-78	(13)	(6)		(7)						
Air Cav Sqdn	RECAP	17-205	85	30	27	28						
HHT, Air Cav Sqdn		17-206	(4)			(4)						
Air Cav Trp (3)		17-208	(81)	(30)	(27)	(24)						
Maint Bn	RECAP	29-15	1			1						
Acft Maint Co		55-89	(1)			(1)						
Infantry Division (Reserve)	RECAP✓	7	102	42	15	45						
HHB, Div Arty		6-302	(14)	(14)								
HHC, Inf Bde (3)		7-42	(18)	(12)		(6)						
Avn Bn, Inf Div	RECAP	7-75	42	6	6	30						
Aslt Hel Co		7-77	(29)		(6)	(23)						
Avn GS Co		7-78	(13)	(6)		(7)						
Armd Cav Sqdn	RECAP	17-105	27	10	9	8						

1-1. Basis of Issue — Aircraft Authorization per Unit (CONT).

UNIT		TOE	TOTAL ACFT	LOH	AH-1G	UH-1H	CH-47	CH-54	OV-1B	OV-1C	U-21	U-10
<u>Air Cav Trp</u>		17-108	(27)	(10)	(9)	(8)						
Maint Bn	RECAP	29-15	1			1						
Acft Maint Co		55-89	(1)			(1)						
Airborne Division	RECAP	57-	160	62	33	65						
HHB, Div Arty		6-201	(14)	(14)								
Air Cav Sqdn	RECAP	17-275	85	30	27	28						
<u>HHT, Air Cav Sqdn</u>		17-276	(4)			(4)						
<u>Air Cav Trp (3)</u>		17-278	(81)	(30)	(27)	(24)						
Maint Bn	RECAP	29-55	1			1						
Acft Maint Co		55-99	(1)			(1)						
HHC, Abn Div Bde (3)		57-42	(18)	(12)		(6)						
Avn Bn, Abn Div	RECAP	57-55	42	6	6	30						
<u>Aslt Hel Co</u>		57-57	(29)		(6)	(23)						
<u>Avn GS Co</u>		57-58	(13)	(6)		(7)						

1-1. Basis of Issue — Aircraft Authorization per Unit (CONT).

UNIT	TOE	TOTAL ACFT	LOH	AH-1G	UH-1H	CH-47	CH-54	OV-1B	OV-1C	U-21	STANO UH-1M	U-10
Airmobile Division	RECAP	67	422	88	87	193	48					
Div Arty	RECAP	6-700	58	16	36	6					6	
*Avn Btry (Div Arty)		6-702	(19)	(16)		(3)						
FA Bn Aerial Arty	RECAP	6-725	39		36	3						
H&S Btry, Aerial Arty ..		6-726	(3)			(3)						
Arty Btry, Aer Arty (3) ..		6-727	(36)		(36)							
Avn Gp	RECAP	7-200	226	16	24	132	48					
Aslt Spt Hel Bn	RECAP	1-165	50			2	48				6	
HHC, Aslt Spt Hel Bn ..		1-166	(2)			(2)						
Aslt Spt Hel Co (3) ...		1-167	(48)				(48)					
Avn Co (GS)		7-202	(26)	(10)		(10)						
Aslt Hel Bn (2)	RECAP	7-255	150	6	24	120					(6)	
HHC, Aslt Hel Bn (2) ...		7-256	(6)	(6)								
Atk Hel Co (2)		7-257	(24)		(24)							
Aslt Hel Co (6)		7-258	(120)			(120)						
Med Bn	RECAP	8-25	12			12						
HHC, Med Bn		8-26	(12)			(12)						
Air Cav Sqdn	RECAP	17-95	85	30	27	28						
HHT, Air Cav Sqdn		17-96	(4)			(4)						
Air Cav Trp (3)		17-98	(81)	(30)	(27)	(24)						
TC Bn, Acft Maint	RECAP	55-405	5	2		3						
HHC, TC M&S Bn		55-406	(1)			(1)						
Acft Maint Co (2)		55-407	(4)	(2)		(2)						
HHC, Ambl Div Bde (3)		67-42	(36)	(24)		(12)						

1-1 Basis of Issue — Aircraft Authorization per Unit (CONT).

UNIT	TOE	TOTAL ACFT	LOH	AH-1G	UH-1H	CH-47	CH-54	OV-1B	OV-1C	U-21	U-10
TRICAP Division	RECAP	347	98	99	134	16					
HHB, Div Arty		6-302	(11)	(9)	(2)						
HHC, Armd Bde (2)		17-42	(8)	(8)							
Avn Bn	RECAP	17-145	114	6	18	74	16				
HHC, Avn Bn		7-76									
Aslt Spt Hel Co		1-258	(17)		(1)	(16)					
Aslt Hel Co (3)		7-357	(87)	(18)	(69)						
Avn Co (GS)		17-87	(10)	(6)	(4)						
Armd Cav Sqdn	RECAP	17-135	27	10	9	8					
Air Cav Trp		17-108	(27)	(10)	(9)	(8)					
Air Cav Atk Sqdn	RECAP	17-285	88	27	45	16					
HHT, Air Cav Atk Sqdn		17-286	(7)			(7)					
Atk Hel Co (3)		17-287	(81)	(27)	(45)	(9)					
Air Cav Sqdn	RECAP	17-175	85	30	27	28					
HHT, Air Cav Sqdn		17-196	(4)			(4)					
Air Cav Trp		17-198	(81)	(30)	(27)	(24)					
Maint Bn	RECAP	29-315	(1)			(1)					
Acft Maint Co		55-424	(1)			(1)					
HHC, Ambl Bde		67-62	(13)	(8)		(5)					
Separate Brigades											
HHC, Inf Bde (Sep)		7-102	11	8		3					
HHC, Armd Bde (Sep)		17-102	8	6		2					
HHC, Mech Bde (Sep)		37-102	8	6		2					
HHC, Abn Bde (Sep)		57-102	11	8		3					
HHC, Light Inf Bde		77-102	11	8		3					

1-1. Basis of Issue — Aircraft Authorization per Unit (CONT).

UNIT	TOE	TOTAL ACFT	LOH	AH-1G	UH-1H	CH-47	CH-54	OV-1B	OV-1C	U-21	U-10
Armored Cavalry Regiment	RECAP	17-51	49	18	9	22					
HHT, Armd Cav Regt		17-52	(10)	(2)		(8)					
HHT, Cav Sqdn (3)		17-56	(12)	(6)		(6)					
Air Cav Trp		17-58	(27)	(10)	(9)	(8)					
Air Cav Sqdn (Separate)	RECAP	17-195	85	30	27	28					
HHT, Cav Sqdn		17-196	(4)			(4)					
Air Cav Trp (3)		17-198	(81)	(30)	(27)	(24)					
Avn Bde, HHC		1-66	8	2		4				2	
Avn Co, Corps		1-127	10	4		5				1	
Avn Co, Army		1-137	13	3		5				5	
Recon Hel Co		1-177	32	32							
Air Traffic Control		1-207	4			3				1	
Avn Gp, HHC		1-252	5	3		2					
Avn Bn, HHC		1-256	2			2					
Avn Co, Aslt Spt Hel		1-258	17			1	16				
Avn Operating Teams		1-500	9	1	1	1	1	1	1	1	1
Engr Cbt Bn, Army/Corps	RECAP	5-35	2	1		1					
HHC, Engr Cbt Bn		5-36	(2)	(1)		(1)					
Engr Cbt Gp, HHC		5-52	2	2							

1-1. Basis of Issue — Aircraft Authorization per Unit (CONT).

UNIT	TOE	TOTAL ACFT	LOH	AH-1G	UH-1H	CH-47	CH-54	OV-1B	OV-1C	U-21	U-10
Engr Cbt Bde, HHC	5-101	3	2		1						
Engr Const Bde, HHC	5-111	3	2		1						
Engr Const Gp, HHC	5-112	5	4		1						
Engr Comd, HHC	5-201	5	2		2					1	
Engr TOPO Co, Corps	5-327	1			1						
Engr Base Survey Co	5-348	4	2		2						
HHB, Field Arty Gp	6-401	6	6								
HHB, Corps Arty	6-501	2	2								
HHB, Abn Corps Arty	6-502	2	2								
HHB, FA Bde (Pershing)	6-604	6	6								
Field Arty Bn (Pershing)	RECAP 6-615	4			4						
HHB, FA Bn (Pershing)	6-616	(4)			(4)						
Avn Co, Aslt Hel — Separate	7-357	29		6	23						
Med Co, Air Ambulance	8-137	25			25						
Med Det, Hel Ambulance (RC) ..	8-660	2			2						
Med Det, Hel Ambulance (RA) ..	8-660	6			6						
Corps Signal Bn	RECAP 11-15	6	1		5						
HHC, Corps Sig Bn	11-16	(6)	(1)		(5)						

1-1. Basis of Issue — Aircraft Authorization per Unit (CONT).

UNIT		TOE	TOTAL ACFT	LOH	AH-1G	UH-1H	CH-47	CH-54	OV-1B	OV-1C	U-21	U-10
Signal Const Bn	RECAP	11-25	4	4								
HHC, Sig Const Bn		11-26	(4)	(4)								
Signal Cable Const Bn	RECAP	11-45	3	3								
HHC, Sig Cable Const Bn		11-46	(3)	(3)								
Army Comd Sig Rdo/Cable Bn ..	RECAP	11-75	3	2		1						
HHC, Army Comd Sig Rdo/Cab Bn		11-76	(3)	(2)		(1)						
Army Area Sig Bn	RECAP	11-85	1	1								
HHC Sig Army Area Bn		11-86	(1)	(1)								
Army Comd Sig Op Bn	RECAP	11-95	9	2		5					2	
HHC, Army Comd Sig Op Bn		11-96	(9)	(2)		(5)					(2)	
HHC Sig Bde, Army		11-102	3			2					1	
HHD, Sig Bn		11-116	1	1								
HHD, Sig Gp, Army		11-122	4	2		1					1	
Abn Corps, Sig Bn	RECAP	11-225	6	1		5						
HHC, Sig Bn, Abn Corps		11-226	(6)	(1)		(5)						
HHC, USA Strategic Command ..		11-302	1								1	
Sig Co, Msgrr		11-358	7			2					5	
Sig Radio Relay Co		11-377	1			1						
Avn Co, Atk Hel		17-111	23		21	2						

1-1. Basis of Issue — Aircraft Authorization per Unit (CONT).

UNIT	TOE	TOTAL ACFT	LOH	AH-1G	UH-1H	CH-47	OV-1B	OV-1C	OV-1D	U-21	U-10
MP Bde, HHD	19-262	2	1		1						
MP Gp, HHD	19-272	5	3		2						
Scout Organization	20-500	2			1					1	
MI Bn, Air Recon Spt (MIBARS)	RECAP 30-5	5								5	
HHC, MI Bn, Air Recon Spt	30-6	(5)								(5)	
MI Co, Aerial Survl	30-79	18							18		
Avn Co, Survl Airplane	30-128	18					6	12			
Abn Spec Forces Gp	RECAP 31-101	6	4								2
Spec Forces Spt Bn	RECAP 31-125	(6)	(4)								(2)
HHC, Spec Forces Spt Bn ..	31-126	(6)	(4)								(2)
ASA Gp Field Army	32-52	12	9							3	
ASA Co Div Spt	32-57	3			3 ^{2/}						
ASA Avn Co (ELIS)	32-59	15								15 ^{2/}	
ASA Avn Co (EW)	32-97	9								9 ^{2/}	
Ms1 Comd (Air Trans)	39-52	4	2		2						
ADA Bde, HHB	44-2	3	1		1					1	

1-1. Basis of Issue – Aircraft Authorization per Unit (CONT).

UNIT	TOE	TOTAL ACFT	LOH	AH-1G	UH-1H	CH-47	CH-54	OV-1B	OV-1C	U-21	U-10
ADA Gp, HHB	44-12	2	1		1						
ADA Bde, HHB	44-102	2			2						
ADA Gp, HHB	44-112	2			2						
FASCOM, HHC	54-12	3	2							1	
Spt Bde, HHC	54-22	2	1							1	
Trans Mvmt Con Center, HHD ..	55-6	1			1						
Trans Motor Trans Bde, HHC ..	55-11	1	1								
Trans Bde, HHC (COSCOM) ...	55-62	2	2								
Trans Tml Bde, HHC	55-111	1	1								
Trans Tml Gp, HHC	55-112	1	1								
Trans Rwy Gp, HHC	55-202	1	1								
<u>Avn Co, Hvy Hel</u>	55-259	10			1		9				
TC Co, Acft DS	55-457	2			2						
TC Co, Acft GS	55-458	3			2	1					
TC Bn, Acft Depot Maint	RECAP 55-465	2			2						
HHC, Trans Acft Depot											
Maint (Seaborne)	55-466	(2)			(2)						
HHC Div (Training)	97-4	3			2						

Note: Organic DS maintenance capability is to be provided in those units which are underlined.

^{1/} In ASOP and JSOP has same BOI as Active Infantry Division (160 aircraft).

^{2/} RU-Type aircraft.

Source: OACSFOR

1-2. Test and Test Support Aircraft.

Requirements for test and test support aircraft are established as follows:

a. All plans of test or research/development programs which require the use of aircraft for any phase will identify the specific type of aircraft required and the purpose (e.g., competitive evaluation of navigation aids in utility helicopter, air transportability of missile in cargo helicopter).

b. The agency providing test service to customers normally requires one aircraft to support two plans of test, with the following exceptions:

(1) An aircraft which is on bailment for an extended period cannot be considered as an available asset to fill additional requirements.

(2) An aircraft which has been modified to a special configuration (flying lab, armament test bed) in support of a particular specialized long range R & D program may not be considered as a suitable available asset to apply against normal test and test support aircraft requirements during a given fiscal year. (However, this aircraft may become available for use in other programs in subsequent years.) Nonstandard aircraft assets shall not be considered as suitable substitutes for Army aircraft when computing test and test support aircraft requirements. Requirements should be based on use of Army-type aircraft to support Army programs. Use of nonstandard aircraft (C-47, T-28) for Army test programs will be authorized only if an Army-type aircraft cannot be made available or is not suitable for the intended purpose.

Example: A USAF jet aircraft may be necessary for missile chase at firing sites.

c. In addition to aircraft originally assigned to support research, development, test, and evaluation, additional aircraft may be allocated, if required, in accordance with revised development/test programs.

1-3. Authorized Aircraft Designations.

a. All Department of Army Aircraft have been assigned designations in accordance with provisions of AR 700-26. Explanation of terms are as follows:

(1) Status prefix symbol. The status symbol (letter), will indicate an aircraft being used for experimentation and special or service test and will be placed at the immediate left of the modified mission symbol, or the mission/type symbol if no modified mission symbol is applicable.

(2) Modified mission symbol. A letter used to indicate the current capability of an aircraft when it is so modified that its original intended capability is no longer applicable, or when it has an added or restricted capability. The modified mission symbol will consist of a prefix letter placed at the immediate left of the basic mission or type symbol. Only one modified mission symbol will be used in any one designation.

(3) Basic mission symbol. A letter used to indicate the basic intended function or capability of the aircraft, such as observation, utility, etc.

(4) Type symbol. An additional letter which designates helicopter and V/STOL aircraft. An aircraft identified by a type symbol, such as "H" for helicopter, will be further identified by only one mission symbol whether it be basic mission or a modified mission symbol. (A basic mission or type symbol, once officially assigned, will not be changed without the approval of the Assistant Secretary of Defense (Installation and Logistics)).

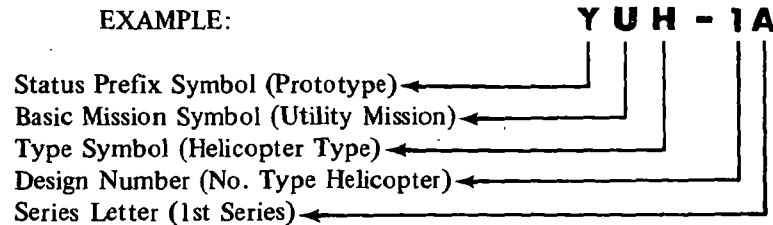
(5) Design number. The sequence number of each new design of the same basic mission or type aircraft. A number will be assigned consecutively for each basic mission or type. New design numbers will be assigned when an existing aircraft is redesigned to an extent that it no longer reflects the original configuration or capability.

(6) Series letter. A letter used to denote differences affecting the relation of the vehicle to its ground environment, and major modifications to the aircraft which result in significant changes to its logistic support. A letter will be assigned to each series change of a specific basic design. In designing new aircraft, the series letter will be in consecutive order

starting with the letter "A." To avoid confusion, the letters "I" and "O" will not be used as series symbols. (Examples of series symbol change would be installation of different engines, propellers, extra fuel tank, etc.)

(7) Complete designation. The complete designation shall consist of items (1) through (6) as applicable, in the order shown. A dash (-) will be inserted between the basic mission/type symbol and the design number.

EXAMPLE:



b. Status prefix symbols (classification letters) are as follows:

LETTER	TITLE	DESCRIPTION
G	Permanently Grounded	An aircraft permanently grounded, used for ground instruction and training.
J	Special Test, Temporary	Aircraft on special test programs by authorized organizations or on bailment contract having a special test configuration or whose installed property has been temporarily removed to accommodate the test. At completion of the test, the vehicle will be returned either to its original configuration or to standard operational configuration.
N	Special Test, Permanent	Aircraft on special test programs by authorized activities or on bailment contract, whose configuration is so drastically changed that return of aircraft to its original configuration or conversion to standard operational configuration is beyond practicable or economical limits.
X	Experimental	Aircraft in a developmental, experimental stage where basic mission and design number have been designated but not established as a standard vehicle for service use.

LETTER	TITLE	DESCRIPTION
Y	Prototype	Aircraft procured in limited quantities to develop the potentialities of the design.
Z	Planning	Designations used for identification purpose during the planning or pre-development stage.

c. Modified missions symbols (prefix letters) are as follows:

LETTER	TITLE	DESCRIPTION
A	Attack	Aircraft modified to search out, attack, and destroy enemy land or sea targets, using conventional or special weapons. Also used for interdiction and close air support mission.
C	Cargo/ Transport	Aircraft modified for carrying cargo and/or passengers.
Q	Drone	Aircraft modified to be controlled from a point outside the aircraft.
R	Reconnaissance	Aircraft modified and permanently equipped for photographic and/or electronic reconnaissance missions.
T	Trainer	Aircraft modified and equipped for training purposes.
U	Utility	Aircraft having small payload, modified to perform miscellaneous missions such as carrying cargo or passengers, and towing targets.
V	Staff	Aircraft modified to provide accommodations such as chairs, tables, lounge, and berths for the transportation of staff personnel.

d. Basic mission and type symbols are as follows:

LETTER	TITLE	DESCRIPTION
A	Attack	Aircraft designed to search out, attack, and destroy enemy land or sea targets, using conventional or special weapons. Also used for interdiction and close air support missions.

LETTER	TITLE	DESCRIPTION
C	Cargo/ Transport	Aircraft designed for carrying cargo and/or passengers.
H	Helicopter	A rotary-wing aircraft designed with the capability of flight in any plan; e.g., horizontal, vertical, or diagonal.
O	Observation	Aircraft designed to observe (through visual or other means) and report tactical information concerning composition and disposition of enemy forces, troops, and supplies in an active combat area.
R	Reconnaissance	Aircraft designed to perform reconnaissance missions.
T	Trainer	Aircraft designed for training personnel in the operation of aircraft and/or related equipment, and having provisions for instructor personnel.
U	Utility	Aircraft used for miscellaneous missions such as carrying cargo and/or passengers, towing targets, etc. These aircraft include those having a small payload.
V	VTOL and STOL	Aircraft designed for vertical takeoff or landing with no takeoff or landing roll, or aircraft capable of takeoff and landing in a minimum prescribed distance.
X	Research	Aircraft designed for testing configurations of radical nature. These aircraft are not normally intended for use as tactical aircraft.

e. Application for a special aircraft designation or cancellation of a previously authorized designation may be accomplished by addressing the request to C.G. U.S. Army Materiel Command, Attn: AMCRD-F, Washington, D.C. 20315.

f. A complete listing of model designations assigned to military aircraft is contained in Army Pamphlet 700-6.

Section II. FLYING HOUR PROGRAM

The flying hour program can be calculated by taking the average inventory for the command and multiplying it by the annual flying hour program for the particular aircraft.

Example:

USCONARC	
OV-1 – Fiscal year 1973	
Average number of aircraft	13
Annual flying hour rate	240
13 X 240 = 3120 hours	

Source: OACSFOR

1-4. Basic Annual Flying Hour Planning Factors 1/.

a. A Worldwide Flying Hour Program is developed annually by the Department of the Army for use in budget preparation and in planning for logistical support of aircraft. It is used as a basis for management of the entire aircraft inventory and is not applicable to the operation of a single aircraft or to the aircraft of any specific aviation unit or activity.

b. The flying hour program for each major command is published annually in Chapter V, Section 4 of the Department of the Army Program and Budget Guidance Document. This document lists flying hour guidance in bulk flying hours for each type of aircraft assigned to the major commands. Factors considered in development of command flying hour programs include: the projected aircraft inventory, mission requirements of the command, aviator availability,

budgetary limitations, logistical considerations and other variables which may affect aircraft utilization within the commands. The DA Flying Hour Program is not expressed in flying hour rates.

c. The basic flying hour planning factors contained below are suitable for use in intermediate and long range planning at any level of command. Two points of rationale used in the development of these factors should be considered in planning applications; these are:

(1) Aircraft assigned to TOE units are intended to meet combat requirements. In a peacetime situation or noncombat environment, utilization of these aircraft should be restricted to only that flying time necessary to provide adequate training for aviation units and other units which are supported by aviation units.

(2) Indirect support aircraft are assigned to TDA units and must meet specific administrative, training, or RDTE requirements. Utilization of indirect support aircraft, except training and training support aircraft assigned to the aviation training base and RDTE aircraft, must meet or exceed the planning factors shown, to justify retention in the aircraft inventory at every level of command. Utilization of training base aircraft is determined by the student training rate approved or programmed for the year under consideration. Utilization of RDTE aircraft is basically determined by the requirements of the RDTE programs supported.

1-5. Basic Annual Flying Hour Planning Factors ^{1/}

TYPE AIRCRAFT	TOE PEACETIME OR NON-COMBAT ENVIRONMENT (WORLDWIDE)	TOE ACTIVE COMBAT ENVIRONMENT	INDIRECT SUPPORT AIRCRAFT (WORLDWIDE) ALL ENVIRONMENT ^{2/3/}
U-8/10	384	900	600
U-21	384	900	600
OV-1	240	840	600
T-41			600
T-42			600
OH-6	240	840	600
OH-13	240	660	420
OH-58	240	840	420
UH-1 (Armed)	240	720	420
UH-1B/C/M	324	720	420
UH-1D/H	324	960	420
AH-1G	240	840	
CH-47	240	720	
CH-54	180	600	420

^{1/} All factors include operational readiness float aircraft.^{2/} Does not include training and training support aircraft assigned to the training base.^{3/} Does not include RDTE (test and test support) aircraft.

Source: OACSFOR

Section III. ATTRITION

1-6. Attrition Factors, World-Wide Monthly Rates.

	AIRCRAFT SYSTEMS	WORLD WIDE PEACETIME
Airplane	Observation: O-1	.0018
	Combat Surveillance: OV-1	.0010
	Utility: U-10	.0049*
	Fixed Wing Trainer: T-41	.0007*
	Instrument Trainer: T-42	.0020*
	Utility: U-8/RU-8	.0016
	Utility: U-21/RU-21	.0016
	Utility: U-9/RU-9	.0019*
Helicopter	Instrument Trainer: TH-13	.0004*
	Primary Trainer: TH-55	.0013*
	Cargo Transport: CH-47	.0009
	Cargo Transport: CH-54	.0009
	Observation: OH-6	.0048
	Observation: OH-13	.0021
	Observation: OH-58	.0021
	Utility: UH-1	.0025
	Attack: AH-1G	.0031

*Indicates attrition factors formulated as outlined in paragraph 1-7, Section III, Chapter 1 of this manual. Other attrition factors are DA directed.

Source: AVSCOM (AMSAV-QMA)

1-7. Formula for Calculating Monthly Attrition Factors.

Example:

Peacetime Attrition Factor, T-41 Aircraft.

1. Time Frame = 24 months.
2. Density (average) = 229. Note: To arrive at an average in use density the following category of aircraft were not considered.
 - a. USARV inventory and losses.
 - b. Maintenance trainers.
 - c. Depot inventory/war reserves/claimant stocks.

d. Aircraft in-transit.

3. Attrition (losses) during time frame = 4.

4. Factor calculation:

$4 \text{ attrition} \div 24 \text{ months} = .1667 \div 229 \text{ density} = .0007$ (monthly peacetime attrition factors).

5. Comments:

Variations between prior and present factors are attributed mainly to the number of accident losses and to inventory increases or decreases during FY 71 thru 72.

Source: AVSCOM (AMSAV-QMA)

Section IV. STANDARD AIRCRAFT CHARACTERISTICS

Standard aircraft characteristic data contained herein will change as modifications or additions and deletions of aircraft components or equipment are made.

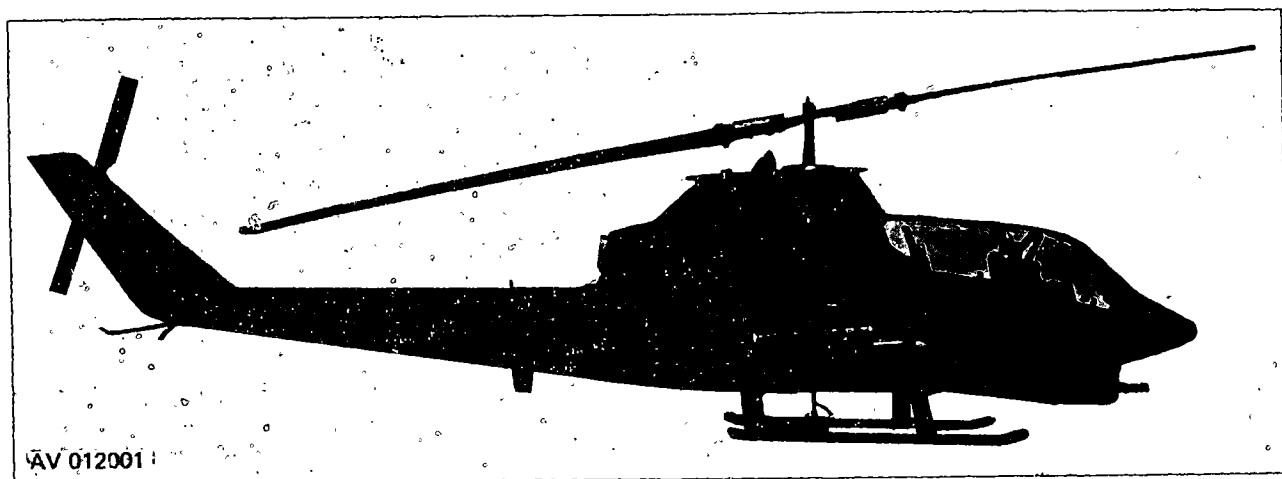


Figure 1-1. AH-1G (Hueycobra)

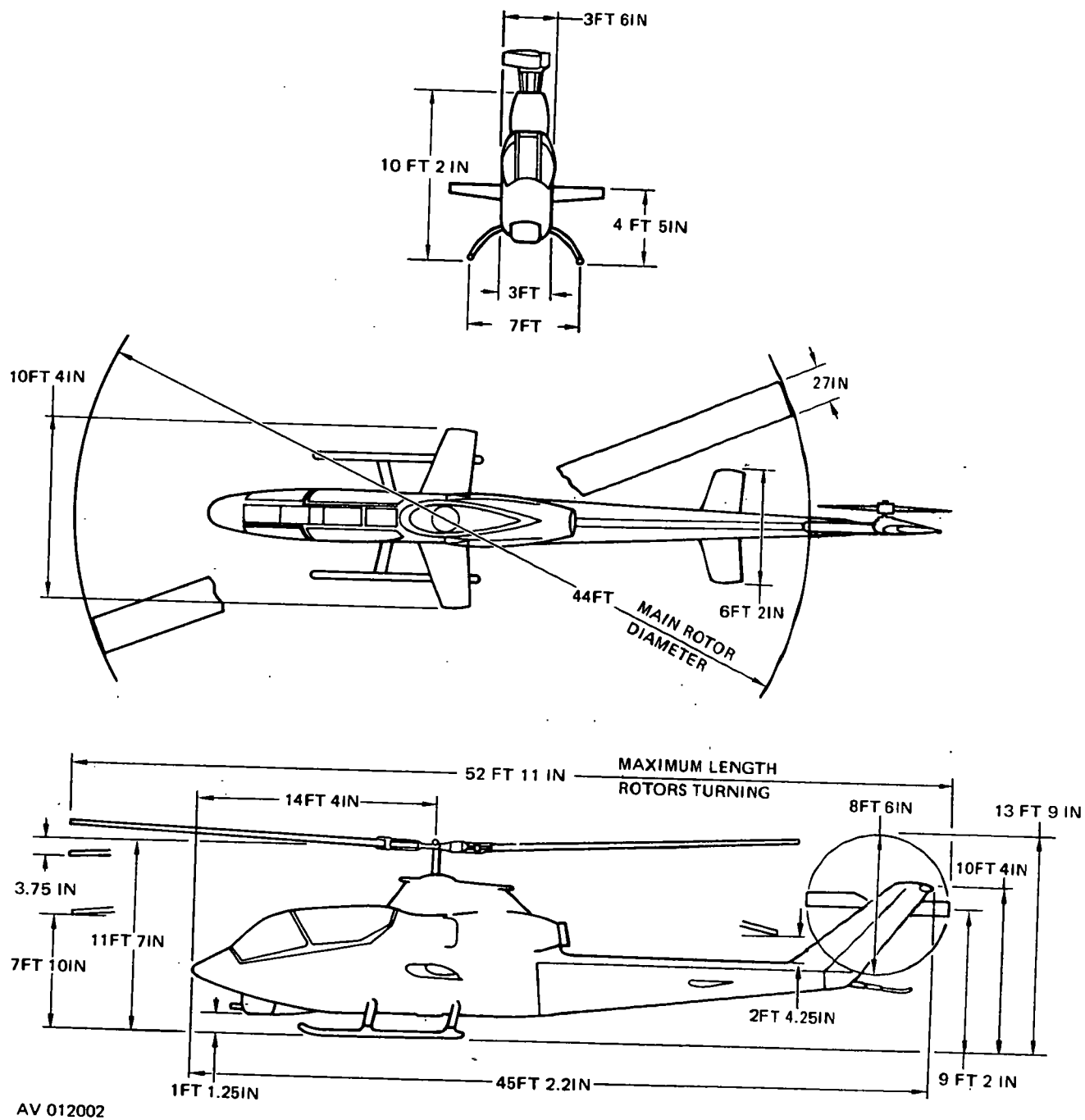


Figure 1-2. Principal dimensions, AH-1G (Hueycobra)

1-8. AH-1G/TH-1G* (Hueycobra) Characteristics.

POWERPLANT						MISSION AND DESCRIPTION		WEIGHTS		
No. and Model (1) T53-L-13B Mfr Lycoming Engine Spec. No. 104.33 Type Free Power Turbine Reduction Gear Ratio 0.3115 Tail Pipe Fixed Area Augmentation None						Mfr's Model: Bell 209 The primary missions of this aircraft are that of an armed tactical helicopter capable of delivering weapons fire, low altitude high speed flight, search and target acquisition, reconnaissance by fire, multiple weapons fire support, and troop helicopter support. The aircraft is capable of performing these missions from prepared or unprepared areas, under day and night VFR or IMC conditions within a temperature range of -25° F to +125° F. The gas turbine powered "Hueycobra" is of compact design featuring tandem seating to give both pilot and gunner nearly unlimited visibility. Both crew stations have flight control and fire control systems permitting flexibility in division of functions under all normal and emergency situations. A mission designed fuselage coupled with the 540 "Door Hinge" rotor system gives a low vibration level plus increased maneuverability and speed. Four wing stores stations and an integral chin turret provide a high degree of armament versatility with the capability of quickly changing a wide combination of weapons to match the desired mission. Reliability and maintainability are ensured through the use of many UH-1 parts which have been combat proven. Official operations and maintenance publications pertaining to the AH-1G are listed under TM 55-1520-221 series manuals. Other features include a crashworthy fuel system with closed circuit refueling capability, and a tractor tailrotor system.		LOADING	LB.	L.F.
								Empty	5425 (C)	
								Basic	5479*(C)	
							Design	6600	3.5	
							Combat			
							Clean	6231 (C)	3.7	
							Light Scout	8148 (C)	2.8	
							Heavy Scout	7937 (C)	2.9	
							Hog	7020 (C)	3.3	
							Max. Takcoff	9500	2.4	
							Max. Landing	9500		
ENGINE RATINGS								(C) Calculated		
								* For Basic Mission		
								FUEL AND OIL		
								Fuel:		
								Grade	JP-4/5	
								Spec	MIL-T-5624	
								No. tanks	2	
								Location	Fuselage	
								Qty	258 gal	
								Oil:		
								Spec	MIL-L-7808/ MIL-L-23699	
								No. tanks	1	
								Location	Fuselage	
								Qty	3.4 gal	
								AVIONICS		
								Refer to chapter 2.		
								ARMAMENT		
								Refer to chapter 2.		

SEA LEVEL						NET JET					
STD		ESHP		SHP		THRUST		RPM		MIN	
						(LBS)					
Military		1450		1400		126		6300		30	
Normal		1296		1250		115		6040		Cont.	

DIMENSIONS					
Rotor dia 44 ft.					
Length:					
Rotors					
operating 53 ft.					
Rotors static 53 ft.					
Fuselage 45 ft, 2-1/4 in.					
Span (max					
lateral) 10 ft, 4 in.					
Height 11 ft, 7 in.					
Tread 7 ft.					
Rotor gnd clear-					
ance (static) 7 ft, 10 in.					

DEVELOPMENT					
Date of contract 4 April 1966					
First flight (Similar aircraft) 7 September 1965					
First acft delivered 18 September 1966					

FEATURES			PERSONNEL		
Advanced flexible gun turret.			Light Scout, Heavy Scout or		
Armor protection for crew and			Hog Mission		
critical components.			Pilot 1		
Hardpoints for rockets, and			Gunner 1		
external stores on wings.					
Stability Control Augmentation			Ferry Mission		
System (SAS) eliminates stabi-			Pilot 1		
lizer bar and provides a stable			Copilot 1		
gun platform.					

*TH-1G. Addition of Instructor Flight Controls and Instrument Panel converts the AH-1G to the TH-1G.

1-9. Loading and Performance — Typical Mission AH-1G (Hueycobra).

CONDITIONS	MISSION I LIGHT SCOUT	MISSION II HEAVY SCOUT	MISSION III HOG	MISSION IV FERRY (CLEAN)
TAKEOFF WEIGHT(lb) (4)	9171	9500	9500	7671
Fuel at 6.5 lbs/gal (Grade JP-4)(lb)	1572	1277	1025	1672
Payload (Outbound)(lb)	1792	2416	2668	192
Payload (inbound)(lb)	1384	1384	604	192
Takeoff Power Loading(lb SHP) (1)*	8.34	8.64	8.64	6.97
Disk Loading(lb sq ft)	6.04	6.25	6.25	5.05
Autorotation Speed (Min R/D)(kn)	65	65	65	65
Takeoff Ground Run at SL(ft) (1)*	105	127	127	0
Takeoff to Clear 50 ft(ft) (1)*	267	344	344	0
Vertical Rate of Climb at SL(fpm) (1)*	-	-	-	1210
Maximum Rate of Climb at SL(fpm) (2)*	1330	1230	1230	1860
Speed for Max R/C at SL(kn)	64	65	65	60
Time: SL to 5000 ft(min) (2)	3.7	4.0	4.0	2.7
Time: SL to 10,000 ft(min) (2)	8.3	9.2	9.2	5.6
Service Ceiling (100 fpm)(ft) (2)	12450	11420	11420	18200
Absolute Hovering Ceiling(ft) (1)	-	-	-	10650
COMBAT RANGE(nmi) (3)	-	-	-	371.1
Average Cruise Speed(kn)	-	-	-	141
Cruising Altitude (Initial)(ft)	-	-	-	10000
Cruising Altitude (Final)(ft)	-	-	-	10000
Total Mission Time(hr)	-	-	-	2.7
COMBAT RADIUS(nmi) (3)	141.1	95.3	70.1	-
Average Cruise Speed(kn)	133	125	125	-
Cruising Altitude (Outboard) (Min/Max) .(ft)	6350/9800	5350/7250	5600/7200	-
Cruising Altitude (Inboard)(ft)	10000	10000	10000	-
Total Mission Time(hr)	2.4	1.8	1.4	-

1-9. Loading and Performance – Typical Mission AH-1G (Hueycobra) (CONT).

CONDITIONS	MISSION I LIGHT SCOUT	MISSION II HEAVY SCOUT	MISSION III HOG	MISSION IV FERRY (CLEAN)
COMBAT WEIGHT(lb)	8148	7937	7020	6231
Combat Altitude(ft)	Sea Level	Sea Level	Sea Level	10000
Combat Speed(kn) (2)	140	137	132	155
Combat Climb(fpm) (2)	1665	1745	2140	2170
Combat Ceiling (500 ft/min)(ft) (2)	15350	16250	20200	23800
Service Ceiling (100 ft/min)(ft) (2)	16300	17100	21000	24550
Absolute Hovering Ceiling(ft) (1)	8500	9450	13750	17700
Takeoff Ground Run at SL(ft) (1)*	0	0	0	0
Takeoff to Clear 50 ft(ft) (1)*	0	0	0	0
Maximum Rate of Climb at SL(fpm) (2)*	1665	1745	2140	2490
Speed for Max R/C at SL(kn) (2)*	62	61	58	54
Max Speed at SL(kn) (2)*	140	137	132	149
Basic Speed at 5000 ft(kn) (2)*	142	139	135	154
LANDING WEIGHT(lb)	7413	7383	6578	6231
Ground Roll at SL(ft)	0	0	0	0
Total from 50 ft(ft)	0	0	0	0

- (1) Military rated power.
- (2) Normal rated power.
- (3) Detailed description of radius and range missions are presented in paragraph 1-10.
- (4) Includes crew of two (2) at 400 pounds.
- (5) Smoke grenades and full ammo load included.

* Based on transmission limit of 1100 shaft horsepower.

Performance Basis:

- a. Power required is based on "Engineering Phase B Flight Test Results of the AH-1G Bell Helicopter (Hueycobra)".
- b. Power available and fuel flow are based on Lycoming Model Spec. 104.33.
- c. All data are for 6600 rpm.

1-10. Performance Notes, AH-1G (Hueycobra).

LIGHT SCOUT MISSION – Armed Tactical Helicopter – Radius

Start engine; warm-up, takeoff, and climb on course at normal power to 6350 feet initial cruise altitude. Maintain 55-feet-per-minute rate of climb at cruise speed to an altitude of 9800 feet. Descend to sea level and fire rockets during a period of ten (10) minutes combat at normal power. Climb on course to 10,000 feet at normal power and return to home base at cruise speed. Range free allowances are two (2) minutes of normal power for warm-up and takeoff, ten (10) minutes of combat time at normal power, plus ten percent of initial fuel for landing and reserve.

HEAVY SCOUT MISSION – Armed Tactical Helicopter – Radius

Start engine, warmup, takeoff, and climb on course at normal power to 5350 feet initial cruise altitude. Maintain 41.6 feet-per-minute rate of climb at cruise speed to an altitude of 7250 feet. Descend to sea level and fire rockets during a period of ten (10) minutes combat at normal power. Climb on course to 10,000 feet at normal power and return to home base at cruise speed. Range free allowances are two (2) minutes of normal power for warm-up and takeoff, ten (10) minutes of combat time at normal power, plus ten percent of initial fuel for landing and reserve.

HOG MISSION – Armed Tactical Helicopter – Radius

Start engine, warm-up, takeoff, and climb on course at normal power to 5600 feet initial cruise altitude. Maintain 50-feet-per-minute rate of climb at cruise speed to an altitude of 7200 feet. Descend to sea level

and fire rockets during a period of ten (10) minutes combat at normal power. Climb on course to 10,000 feet at normal power and return to home base at cruise speed. Range free allowances are two (2) minutes of normal power for warm-up and takeoff, ten (10) minutes of combat time at normal power, plus ten percent of initial fuel for landing and reserve.

FERRY MISSION – Clean (Without Auxiliary Tanks) – Range

Start engine, warm-up, takeoff, and climb on course at normal power to 10,000 feet initial cruise altitude. Fly out at cruise speeds until ninety percent of initial fuel is consumed and land at remote base. Range free allowance include two (2) minutes at normal rated power for warm-up and takeoff, and ten percent of initial fuel for landing and reserve.

GENERAL NOTES:

- a. Cruise speed as used above denotes airspeed for long-range operation and is the greater of the two speeds at which ninety-nine percent of the maximum miles per pound of fuel are attainable at the momentary weight and altitude.
- b. Data do not include ground effect.

PERFORMANCE BASIS:

- a. Power required is based upon "Engineering Phase B Flight-Test Data".
- b. Power available and fuel flow are based on Lycoming Model Specification No. 104.33, and includes particle separators and filters.

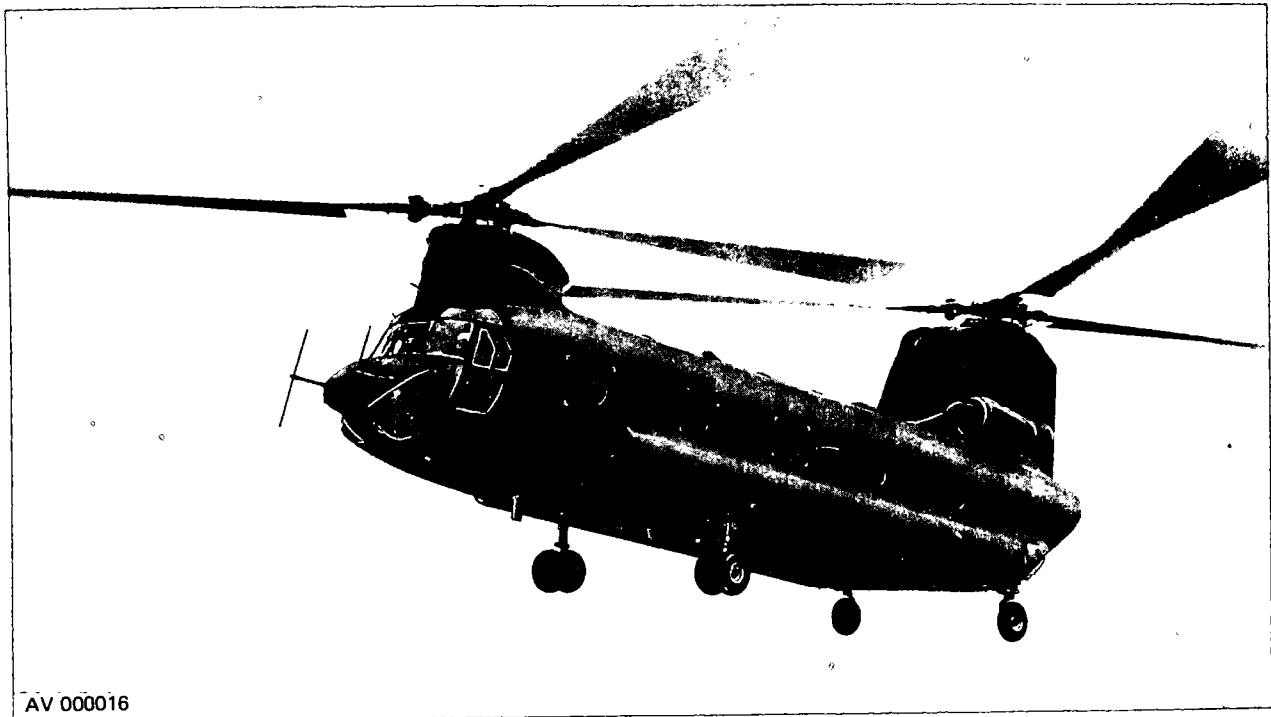


Figure 1-3. CH-47A, B, and C (Chinook), typical (minor differences apparent between A, B, and C models)

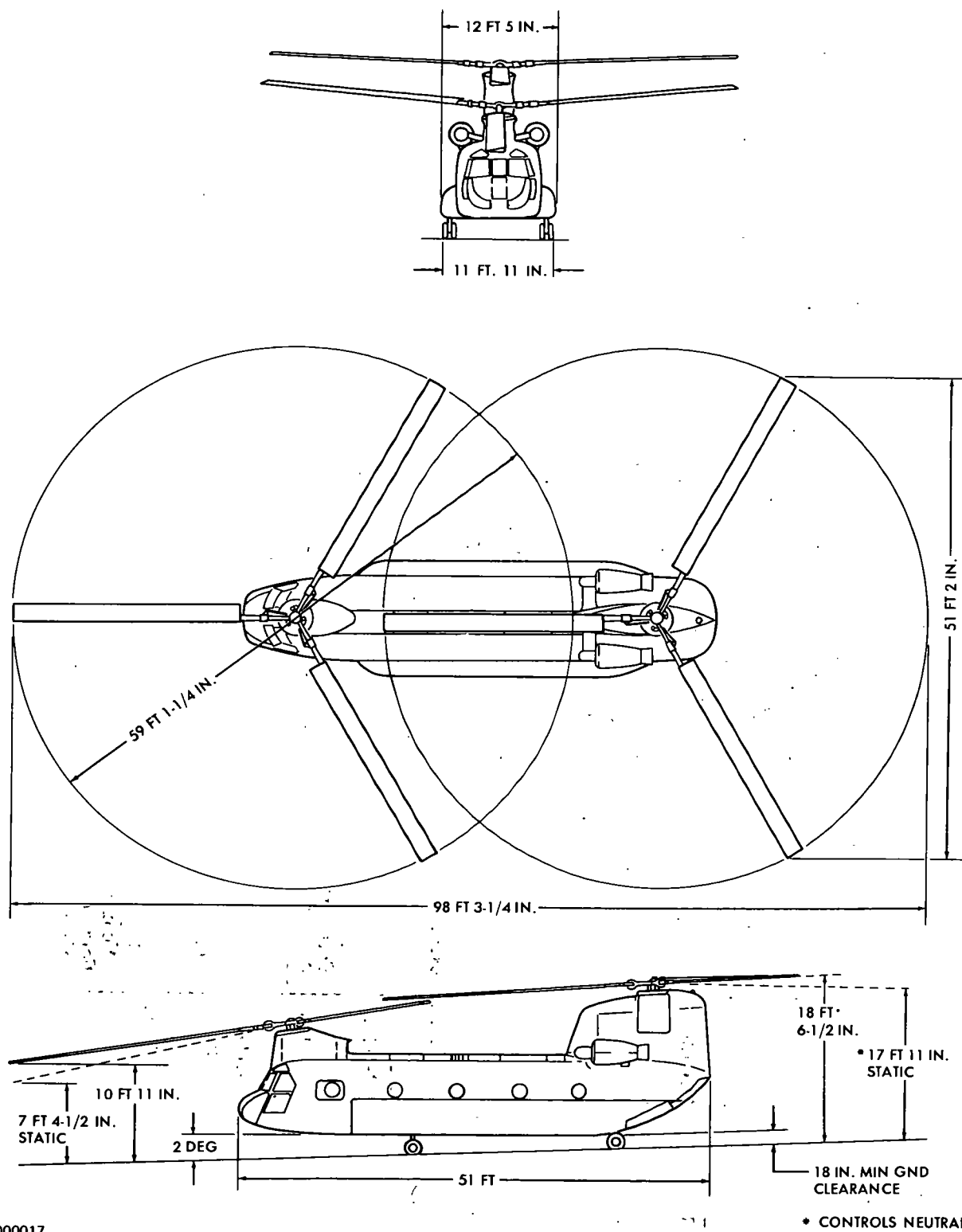


Figure 1-4. Principal dimensions, CH-47A (Chinook)

1-11. CH-47A (Chinook) Characteristics.

POWERPLANT	MISSION AND DESCRIPTION		WEIGHTS	
No. & model (2) T55-L-7 Mfr Lycoming Engine spec No ... T55-L-7/7B 124.20-A T55-L-7C 124.31	Mfr's Model: Vertol The principal mission of the CH-47A helicopter is the transport of cargo, troops, and equipment within the combat area. In addition, this helicopter is suitable for special support functions. It is suitable for operations during day, night, visual, and instrument conditions. The CH-47A helicopter is a twin-turbine-engine, tandem rotary-wing aircraft. It is powered by two Lycoming T55-L-7 shaft turbine engines mounted on the aft fuselage. The engines simultaneously drive two tandem three-bladed rotary wings through a combining transmission, drive shafting, and reduction transmission. The forward transmission is mounted in the pylon above the cockpit. The aft transmission, the combining transmission, and drive shafting are located in the aft pylon section. A gas-turbined auxiliary power unit, used for starting the engines, is mounted in the aft pylon section. Pods on the sides of the fuselage contain fuel tanks. The helicopter is equipped with nonretractable quadricycle landing gear. The aft wheels are full-swivel type. The entrance door is located at the forward right side of the cabin fuselage section. At the rear of the cabin fuselage section is a hydraulically powered loading ramp. A 16,000 pound cargo hook assembly is provided for transporting external loads.		LB L.F. Empty (SPFG) .. 18,084 Design gross wt .. 28,550 2.67 Max alt gross wt .. 33,000 2.00 Max takeoff ... 33,000 2.00 Max landing ... 33,000 2.00	
ENGINE RATINGS			FUEL AND OIL	
SHP RPM ALT MIN T55-L-7 Military 2650 15,150 SL 30 Normal 2200 15,000 SL Cont. T55-L-7B Military 2650 15,800 SL 30 Normal 2200 15,000 SL Cont. T55-L-7C Max 2850 16,000 SL 10 Military 2650 15,750 SL 30 Normal 2400 15,350 SL Cont.			Fuel: Grade JP-4 Spec MIL-T-5624 No. tanks: Nacelle (2) 621 gal (50 percent self-sealing) 630 gal (non-self-sealing) Oil: Spec Temps above -25°F MIL-L-23699 Temps below -25°F MIL-L-7808 No. tanks 2 Location Integral with engine Qty 7 gal	
DIMENSIONS	DEVELOPMENT		AVIONICS	
Rotor dia 59 ft, 1-1/4 in. Length: Rotors operating .. 98 ft, 3-1/4 in. Rotors folded . 51 ft Fuselage 51 ft Height 18 ft, 6-1/2 in. Tread 11 ft, 11 in. Main rotor gnd clearance: Idling (fwd) .. 10 ft, 11 in. (aft) ... 18 ft, 6-1/2 in. Static (fwd) .. 7 ft, 8 in. (aft) ... 17 ft, 11 in.	Date of contract 27 June 1960 First flight 6 September 1961 Production status Completed May 1967		Refer to chapter 2.	
	CAPACITIES	PERSONNEL	ARMAMENT	
	Cargo compartment: Floor 226-1/4 sq ft Length 30 ft, 2 in. Width 7 ft, 6 in. Height 6 ft, 6 in. Volume 1487 cu ft Forward door: Height 5 ft, 6 in. Width 3 ft Cargo ramp door: Length 6 ft, 6 in. Width 7 ft, 6 in.	Crew (normal) 4 Troops 33 Litters 24	Refer to chapter 2.	

1-12. Loading and Performance – Typical Mission, CH-47A (Chinook).

CONDITIONS	MISSION	MISSION	MISSION
	I	II	III
Gross weight (lb) . . .	28,262	33,000	33,000
Weight empty (lb) . . .	17,932	18,112	17,552
Payload (lb) . . .	6000	13,400	---
Radius of action (nmi) . . .	100	20	---
Ferry range (nmi) . . .	---	---	866
Cruise altitude (ft) . . .	SL	SL	6000
Cruise speed (kn) . . .	130	110	110
V _{Max} @ SL military power (kn) . . .	130	110	110
V _{Max} @ SL normal power (kn) . . .	130	110	110
V _{Max} @ 5000 ft, normal power (kn) . . .	114	94	94
Hover ceiling OGE 95°F, military power, std atmosphere (ft) . . .	6000	7900	7900
Hover ceiling IGE military power, std atmosphere . . (ft) . . .	11,900	9200	9200
Service ceiling			
Normal power (ft) . . .	11,900	9200	9200
Military power 1 eng out (ft) . . .	6000	1400	1400
R/C Max – military power – SL (ft/min) . . .	2750	2160	2166

1. All performance based on NASA standard atmosphere unless otherwise noted.
2. V_{Max} reflects airspeed limitations specified in TM55-1520-209-10.
3. CH-47A model specifications 114-X-601.

1-13. Performance Notes, CH-47A (Chinook).

FORMULA: MISSION I

Deliver 6000-pound internal payload to any point 100 nautical miles and return with 3000-pound internal payload. Cruise at sea level. Land with 10 percent of initial fuel reserve.

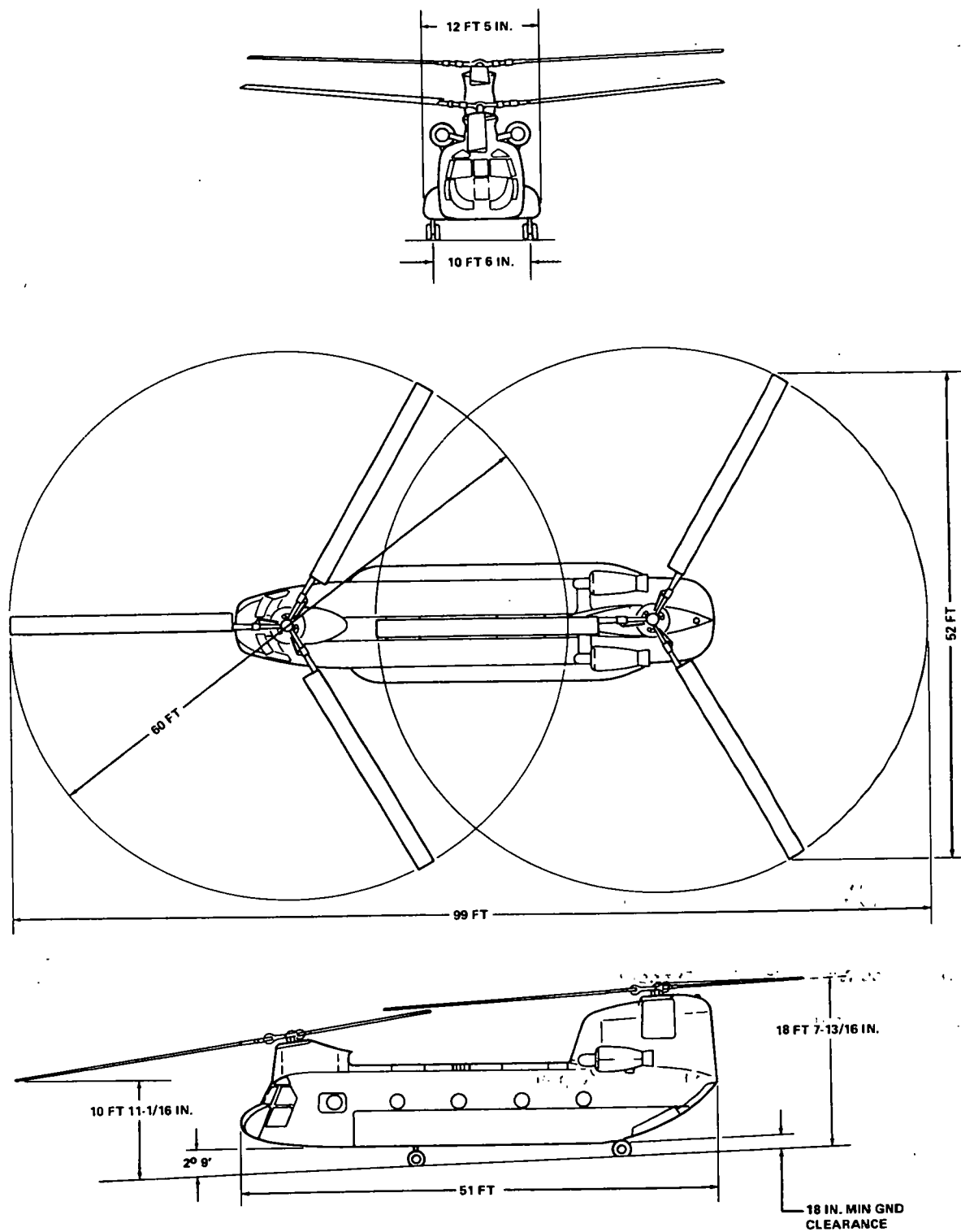
FORMULA: MISSION II

Deliver 13,400-pound external payload to any point 20 nautical miles and return. Equivalent flat

plate of external cargo = 26 sq ft. Cruise at sea level. Return with fuel reserve for 10-minute cruise at return gross weight.

FORMULA: MISSION III

Ferry Range of 866 nautical miles. Land with 10 percent of initial fuel reserve. Climb to 6000 feet, 256 nautical miles. Cruise 6000 feet for 610 nautical miles. Total ferry time: 7 hours, 50 minutes.



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Figure 1-5. Principal dimensions, CH-47B and C (Chinook)

1-14. CH-47B (Chinook) Characteristics.

POWERPLANT				MISSION AND DESCRIPTION		WEIGHTS	
No. & Model (2) T55-L-7C Mfr Lycoming Engine spec No. T55-L-7C 124.31 Engine /rotor gear ratio 65.93:1				Mfr's Model: Vertol		LB	L.F.
				The principal mission of the CH-47B helicopter is to provide air transportation for troops and cargo. The aircraft can also be utilized for rescue of personnel.		Empty	*19,153
				The CH-47B is a large tandem rotor helicopter with built-in accommodations for 24 litter patients and 2 attendants or 33 troops and troop commander. The helicopter is equipped with an unobstructed 30-foot long cargo compartment with straight-in rear loading and has a capacity of over 2450 cubic feet. Other features include an external cargo hook of 10-ton capacity which may be used for towing operations; an auxiliary power unit which powers the utility hydraulic system, thus eliminating the requirement for external ground power sources; stability system provided through Vertol SAS; and provisions for utilizing collapsible fuel tanks to increase the fuel capacity by 2000 gallons. The complete helicopter is designed for operations in temperatures ranging from -25° F. to +125° F.		Basic	*19,194
						Design	33,000 3.00
						Combat	*21,734
						Max alternate gross weight ...	40,000 2.54
						Normal takeoff ..	33,000 3.00
						Alternate takeoff .	40,000 2.54
						Max landing	40,000 2.54
						*For basic mission.	
						FUEL AND OIL	
						Fuel:	
						Grade	JP-4
						Spec	MIL-T-5624
						No. tanks:	
						Fuselage	(2) 621 gal
						Oil:	
						Engine contained oil supply	
						Spec	
						Temps above 25° F.	MIL-L-23699
						Temps below 25° F.	MIL-L-7808
						Qty	7 gal
						AVIONICS	
						Refer to chapter 2.	
						ARMAMENT	
						Refer to chapter 2.	

No. & Model (2) T55-L-7C
Mfr Lycoming
Engine spec No.
T55-L-7C 124.31
Engine /rotor gear
ratio 65.93:1

ENGINE RATINGS

	SHP	RPM	ALT	MIN
Maximum	2850	16000	SL	10
Military	2650	15750	SL	30
Normal	2400	15350	SL	Cont.

DIMENSIONS

Rotor dia 60 ft
Length:
Rotors
operating ... 98 ft, 11 in.
Rotors folded . 51 ft
Fuselage 51 ft
Height (overall) . 18 ft, 7-3/4 in.
Tread 11 ft, 11 in.
Rotor ground clearance:
Static fwd 7 ft, 2-1/2 in.
Idling fwd 10 ft, 11 in.

MISSION AND DESCRIPTION

Mfr's Model: Vertol

The principal mission of the CH-47B helicopter is to provide air transportation for troops and cargo. The aircraft can also be utilized for rescue of personnel.

The CH-47B is a large tandem rotor helicopter with built-in accommodations for 24 litter patients and 2 attendants or 33 troops and troop commander. The helicopter is equipped with an unobstructed 30-foot long cargo compartment with straight-in rear loading and has a capacity of over 2450 cubic feet. Other features include an external cargo hook of 10-ton capacity which may be used for towing operations; an auxiliary power unit which powers the utility hydraulic system, thus eliminating the requirement for external ground power sources; stability system provided through Vertol SAS; and provisions for utilizing collapsible fuel tanks to increase the fuel capacity by 2000 gallons. The complete helicopter is designed for operations in temperatures ranging from -25° F. to +125° F.

DEVELOPMENT

Date of contract June 1966
First flight October 1966
Production status Completed February 1968

CAPACITIES	PERSONNEL
Cargo compartment:	
Floor 226-1/4 sq ft	Crew 4
Length 30 ft, 2 in.	Litters 24
Width 7 ft, 6 in.	
Height 6 ft, 6 in.	or
Volume 1487 cu ft	Troops 33
Forward door:	
Height 5 ft, 6 in.	
Width 3 ft	
Cargo ramp door:	
Length 6 ft, 6 in.	
Width 7 ft, 6 in.	

1-15. Loading and Performance – Typical Mission, CH-47B (Chinook)

CONDITIONS	BASIC MISSION ^{4/} I	BASIC MISSION ^{5/} (DESIGN GW) II	PRIMARY MISSION ^{6/} III	EXTERNAL PAYLOAD MISSION ^{9/} IV	MAXIMUM FERRY MISSION ^{10/} V
Estimated gross weight (lb) . . .	30,900	33,000	40,000	40,000	40,000
Payload guaranteed (outbound) (lb) . . .	6,000	-	-	-	-
Payload guaranteed (inbound) (lb) . . .	3,000	-	-	-	-
Payload estimated (outbound) (lb) . . .	7,000	9,000	15,900	18,800	1,075
Payload estimated (inbound) (lb) . . .	3,500	4,500	7,935	0	-
V _{max} at SL/STD, military power (kn) . . .	168 ^{2/}	165 ^{2/}	145 ^{2/}	138 ^{1/2/}	145 ^{2/}
Max cruise speed at SL/STD, normal power,					
Guaranteed (kn) . . .	-	150	-	-	-
Estimated (kn) . . .	166	163	142	132 ^{1/}	142
V-Cruise (best range) at SL/STD (kn) . . .	145	144	134	100 ^{3/}	134
V-Cruise (best range) at 5000 F (kn) . . .	138	134	114	100	114
Max rate-of-climb at SL/STD military power (ft/min) . . .	2,440 ^{2/}	2,200 ^{2/}	1,520 ^{2/}	1,440	1,520
Vertical rate-of-climb at SL/STD, maximum power (ft/min) . . .	2,300 ^{2/}	1,800 ^{2/}	60	60	60
Service ceiling at normal power (ft) . . .	18,000	16,200	9,550	8,950	9,550
Service ceiling, single engine at military power					
Guaranteed (ft) . . .	6,000	-	-	-	-
Estimated (ft) . . .	6,050	3,650	-	-	-
Hover ceiling, OGE at STD temperature maximum power (ft) . . .	12,850	10,650	700 ^{2/}	700 ^{2/}	700 ^{2/}
Hover ceiling, IGE at STD temperature maximum power, 10 ft wheel height (ft) . . .	16,300	14,200	7,400	7,400	7,400
Radius of action					
Guaranteed (nmi) . . .	100	-	-	-	-
Estimated (nmi) . . .	100	100	95	20	-
Ferry range (nmi) . . .	-	-	-	-	1,090

1-15. Loading and Performance — Typical Mission, CH-47B (Chinook) (CONT).

NOTES:

¹/With external payload equivalent to 26 ft. ²/drag area.

²/Transmission limit.

³/Mission cruise speed.

The above table reflects performance capability only. For approved operational limits which consider all pertinent factors, see TM 55-1520-209-10.

For Mission I the helicopter shall be capable of hovering at 6000 ft. for ten minutes at 95°F, OGE at the gross weight required for the accomplishment of Mission I (guaranteed). The Mission I gross weight includes an outbound payload of 6000 lb., return payload of 3000 lb., and fuel for a radius of 100 nmi.

During Mission III the helicopter shall be capable of hovering out-of-ground effect at sea level standard, maximum power and at a gross weight of 39,500 pounds (guaranteed).

1-16. Performance Notes, CH-47B (Chinook).**FORMULA: RADIUS MISSIONS I & II**

Warm up, take off, climb on course to 5000 feet at normal power, cruise out at long range speeds to remote base, land, and unload cargo. Without refueling, warm up, take off, climb on course to 5000 feet at normal power, and return at long range speeds. Range-free allowances are 2 minutes of normal power for each warmup and takeoff, plus 10 percent of initial fuel for reserve.

FORMULA: RADIUS MISSION III

Warm up, take off, cruise out at long range speeds at sea level to remote base, land, and unload outbound cargo, load inbound cargo. Without refueling, warm up, take off, return at long range speeds at sea level, land, and unload cargo. Range-free allowances are 2 minutes of normal power for each warmup and takeoff, plus 10 percent of initial fuel for reserve.

FORMULA: RADIUS MISSION IV

Warm up, take off, cruise out at 100 knots at sea level with external cargo to remote base, detach cargo, and land. Without refueling, warm up, take off, and return at long range speeds at sea level. Range-free allowances are 2 minutes of normal power for each warmup and takeoff, plus 10 minutes of cruise fuel for reserve.

FORMULA: RANGE MISSIONS I & II

Warm up, take off, climb on course to 5000 feet at normal power, cruise out at long range speeds until 90 percent of initial fuel is consumed, land, and unload cargo. Range-free allowances are 2 minutes of normal power for warmup and takeoff, plus 10 percent of initial fuel for reserve.

FORMULA: RANGE MISSION III

Warm up, take off, cruise out at long range speeds at sea level until 90 percent of initial fuel is consumed, land, and unload cargo. Range-free allowances are 2 minutes of normal power for warmup and takeoff, plus 10 percent of initial fuel for reserve.

FORMULA: RANGE MISSION IV

Warm up, take off, cruise out at 100 knots at sea level with external cargo until 10 minutes of cruise fuel remains, detach cargo, and land. Range-free allowances are 2 minutes of normal power for warmup and takeoff, plus 10 minutes of cruise fuel for reserve.

FORMULA: RANGE MISSION V

Warm up, take off, climb on course to optimum cruise altitude at cruise speed, cruise out at long range speeds until 90 percent of initial fuel is consumed. Range-free allowances are 2 minutes of normal power for warmup and takeoff, plus 10 percent of initial fuel for reserve.

PERFORMANCE REFERENCES

Vertol Report 114-P-J-602. Detail Specifications for the Model CH-47B Helicopter.

Boeing-Vertol Report 114-AD-601. Estimated Performance Capability of CH-47B and CH-47C Helicopters.

Lycoming Model Specification 124.31, T55-L-7C Shaft Turbine Engine.

1-17. CH-47C (Chinook) Characteristics.

POWERPLANT	MISSION AND DESCRIPTION		WEIGHTS	
No. & model (2) T55-L-11A Mfr Lycoming Engine spec No . . 124.38 Engine/Rotor gear ratio 64.05:1	Mfr's Model: Vertol The principal mission of the CH-47C is to provide air transportation for troops and cargo. The aircraft can also be utilized for rescue of personnel. The CH-47C is a large tandem rotor helicopter with built-in accommodations for 24 litter patients and 2 attendants or 33 troops and troop commander. The helicopter is equipped with an unobstructed 30-foot long cargo compartment with straight-in rear loading and has a capacity of over 1450 cubic feet. Other features include an external cargo hook of 10-ton capacity which may be used for towing operations; an auxiliary power unit which powers the utility hydraulic system, thus eliminating the requirements for external ground power sources; stability system provided through Vertol SAS; and provisions for utilizing collapsible fuel tanks to increase the fuel capacity by 2000 gallons. The complete helicopter is designed for operations in temperatures ranging from -25°F to +125°F.		LB	L.F.
ENGINE RATINGS			Empty \$19,723	
SHP RPM ALT MIN	DEVELOPMENT Date of contract June 1966 Aircraft in production January 1969		Basic \$19,772	
Max . . . 3750 16000 SL 10			Design 33,000	3.00
Mil . . . 3400 16000 SL 30			Combat \$23,886	
Nor . . . 3000 15400 SL Cont			Max alternate gross wt 46,000	2.15
DIMENSIONS	CAPACITIES Cargo compartment: Floor 226-1/4 sq ft Length 30 ft, 2 in. Width 7 ft, 6 in. Height 6 ft, 6 in. Volume 1487 cu ft Forward door: Height 5 ft, 6 in. Width 3 ft Cargo ramp door: Length 6 ft, 6 in. Width 7 ft, 6 in.		Normal takeoff 33,000	
Rotor dia 60 ft			Alternate takeoff 46,000	
Length:	PERSONNEL Crew 4 Troops 33 or Litters 24		Max landing 46,000	
Rotors operating . . . 99 ft			FUEL AND OIL	
Rotors folded . 51 ft	Fuel: Grade JP4 Spec MIL-T-5624 No. tanks: Fuselage main. . (2) 621 gal Fuselage aux. . . (4) 520 gal Qty 1141 gal Oil: Engine contained oil supply Spec Temps above 25° F MIL-L-23699 Temps below 25° F MIL-L-7808 Qty 7 gal		AVIONICS	
Fuselage 51 ft	Refer to chapter 2.		ARMAMENT	
Height (overall) . 18 ft, 7-3/4 in.			Refer to chapter 2.	
Tread 11 ft, 11 in.				
Rotor ground clearance				
Static fwd 7 ft, 2-1/2 in.				
Idling fwd 10 ft, 11 in.				

1-18. Loading and Performance – Typical Mission, CH-47C (Chinook).

CONDITIONS	BASIC MISSION I	BASIC MISSION (DESIGN GW) II	PRIMARY MISSION III	EXTERNAL PAYLOAD MISSION IV ^{1/}	MAXIMUM FERRY MISSION V
Gross weight (lb)	39,200 ^{2/}	33,000	46,000	46,000	46,000
Payload guaranteed (outbound) (lb)	12,000	-	-	-	-
Payload guaranteed (inbound) (lb)	6,000	-	-	-	-
Payload estimated (outbound) (lb)	13,300	7,350	19,750	23,300	-
Payload estimated (inbound) (lb)	6,650	3,675	9,875	0	-
V _{max} at SL/STD, military power (kn)	156 ^{4/}	164 ^{3/}	123 ^{4/}	100 ^{5/}	123 ^{4/}
Max cruise speed at SL/STD normal power					
Guaranteed (kn)	-	155	-	-	-
Estimated (kn)	156 ^{4/}	164 ^{3/}	123 ^{4/}	100 ^{5/}	123 ^{4/}
V-Cruise (best range) at SL/STD (kn)	141	140	123 ^{4/}	100 ^{5/}	123 ^{4/}
V-Cruise (best range) at 5000 ft/STD (kn)	136	138	111 ^{4/}	100 ^{5/}	111 ^{4/}
Rate-of-climb at SL/STD military power (ft/min)	2,045 ^{3/}	2,880 ^{3/}	1,380 ^{3/}	1,260 ^{3/}	1,380 ^{3/}
Vertical rate-of-climb at SL/STD maximum power (ft/min)	1,220 ^{3/}	2,585 ^{3/}	-	-	-
Service ceiling at normal power (ft)	10,200 ^{4/}	15,000 ^{9/}	8,000 ^{4/}	8,000 ^{4/}	8,000 ^{4/}
Service ceiling, STD temp, single engine at military power					
Guaranteed (ft)	4,000	-	-	-	-
Estimated (ft)	4,500 ^{2/ 3/}	9,550 ^{2/}	-	-	-
Hover ceiling, OGE at STD temperature, max power (ft)	9,600	14,750	-	-	-
Hover ceiling IGE at STD temperature, maximum power, 10 ft. wheel height	12,750	15,000	7,600	7,600	7,600
Radius of action,					
Guaranteed (nmi)	100	-	-	-	-
Estimated (nmi)	100	100	100	20	-
Ferry range (nmi)	-	-	-	-	1,226

1-18. Loading and Performance – Typical Mission, CH-47C (Chinook) (CONT).

NOTES:

- ^{1/} With External Payload Equivalent to 26 FT² Drag Area (Troop Seats Incl.)
- ^{2/} Hover Gross Weight at 6000 ft/95°F at 245 RPM.
- ^{3/} Transmission Limit.
- ^{4/} Structural Envelope.
- ^{5/} Mission Cruise Speed (Outbound).
- ^{6/} Current Hydraulic System Limit.
- ^{7/} At 230 RPM.
- ^{8/} With 12000 LB Payload.

For Mission I the helicopter shall be capable of hovering at 6000 ft for 10 minutes at 95°F, OGE at gross weight required for accomplishment of Mission I (guaranteed). The Mission I gross weight includes an outbound payload of 12,000 lb., return payload of 6000 lb., and fuel for a radius of 100 nmi.

During Mission III the helicopter shall be capable of hovering out-of-ground effect at SL/STD, maximum power, and a gross weight of 43,000 pounds (guaranteed).

1-19. Performance Notes, CH-47C (Chinook).**FORMULA: RADIUS MISSIONS I & II**

Warm up, take off, climb on course to 5000 feet at normal power, cruise out at long range speeds to remote base, land, and unload cargo. Without refueling, warm up, take off, climb on course to 5000 feet at normal power, and return at long range speeds. Range-free allowances are 2 minutes of normal power for each warmup and takeoff, plus 10 percent of initial fuel for reserve.

FORMULA: RADIUS MISSION III

Warm up, take off, cruise out at long range speeds at sea level to remote base, land, and unload outbound cargo, load inbound cargo. Without refueling, warm up, take off, return at long range speeds at sea level, land and unload cargo. Range-free allowances are 2 minutes of normal power for each warmup and takeoff, plus 10 percent of initial fuel for reserve.

FORMULA: RADIUS MISSION IV

Warm up, take off, cruise out at 100 knots at sea level with external cargo to remote base, detach cargo, and land. Without refueling, warm up, take off, and return at long range speeds at sea level. Range-free allowances are 2 minutes of normal power for each warmup and takeoff, plus 10 minutes of cruise fuel for reserve.

FORMULA: RANGE MISSIONS I & II

Warm up, take off, climb on course to 5000 feet at normal power, cruise out at long range speeds until 90 percent of initial fuel is consumed, land, and

unload cargo. Range-free allowances are 2 minutes of normal power for warmup and takeoff, plus 10 percent of initial fuel for reserve.

FORMULA: RANGE MISSION III

Warm up, take off, cruise out at long range speeds at sea level until 90 percent of initial fuel is consumed, land, and unload cargo. Range-free allowances are 2 minutes of normal power for warmup and takeoff, plus 10 percent of initial fuel for reserve.

FORMULA: RANGE MISSION IV

Warm up, take off, cruise out at 100 knots at sea level with external cargo until 10 minutes of cruise fuel remains, detach cargo, and land. Range-free allowances are 2 minutes of normal power for warmup and takeoff, plus 10 minutes of cruise fuel for reserve.

FORMULA: RANGE MISSION V

Warm up, take off, climb on course to optimum cruise altitude at cruise speed, and cruise out at long range speeds until 90 percent of initial fuel is consumed. Range-free allowances are 2 minutes of normal power for warmup and takeoff, plus 10 percent of initial fuel for reserve.

PERFORMANCE REFERENCES

Vertol Report 114-PJ-7003, Detail Specification for The CH-47C Helicopter.

Lycoming Report 124.27, T55-L-11 Engine Specification.

Boeing-Vertol Report 114-AD-601, Estimated Performance Capabilities of CH-47B and CH-47C Helicopters.

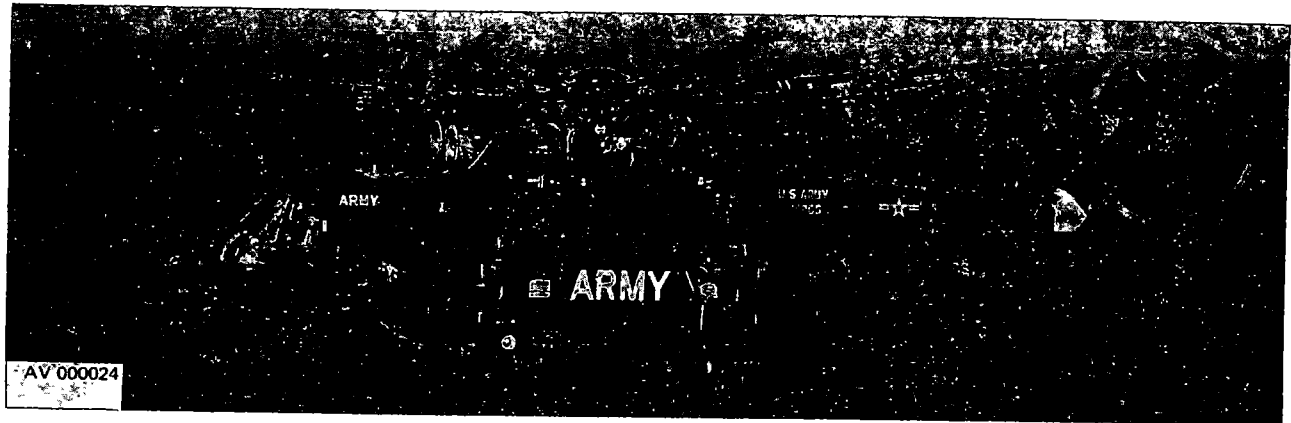
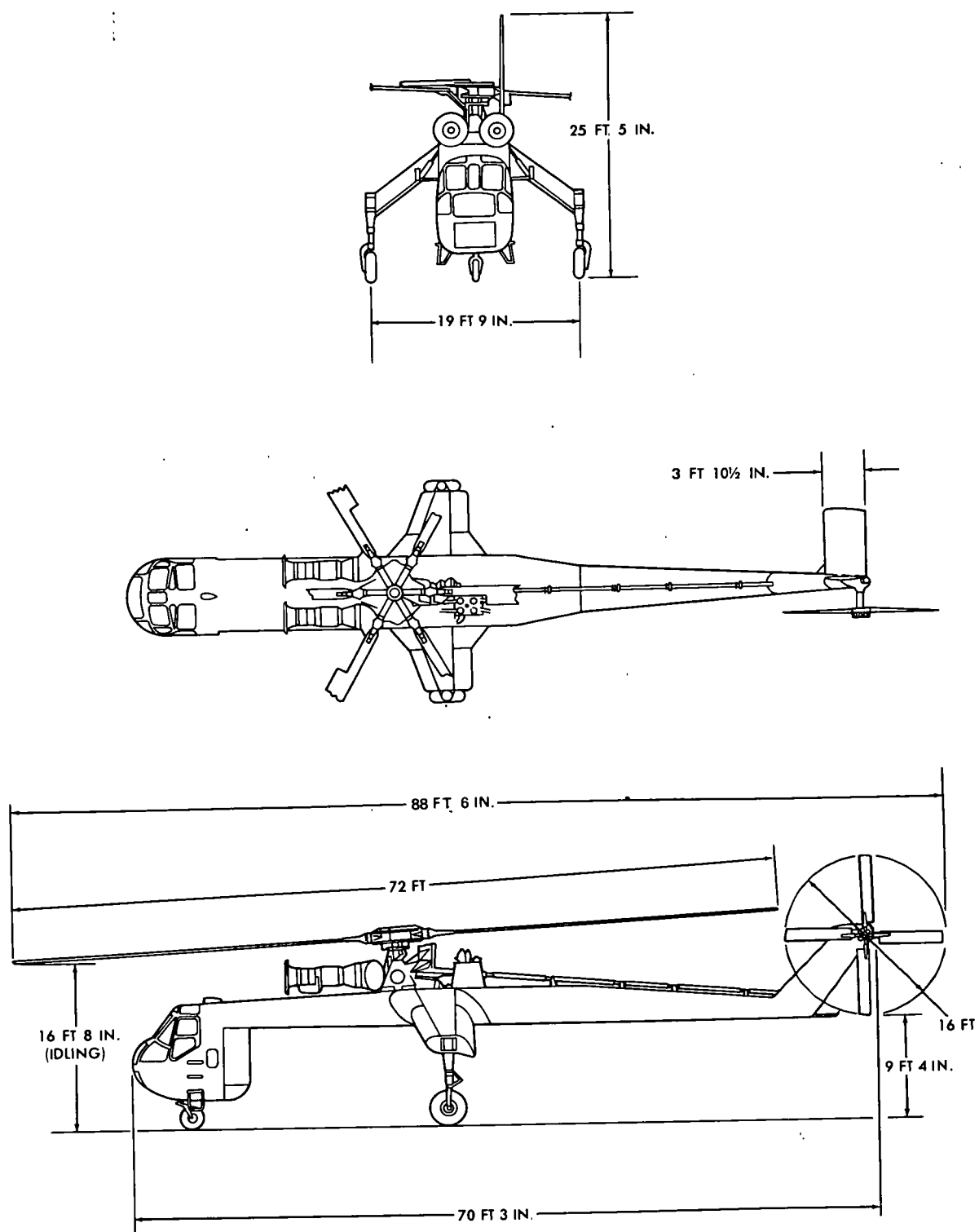


Figure 1-6. Ch-54A and B (Tarhe), typical (minor differences apparent between A and B models)



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Figure 1-7. Principal dimensions, CH-54A and B (Tarhe)

1-20. CH-54A (Tarhe) Characteristics.

POWERPLANT	MISSION AND DESCRIPTION		WEIGHTS	
No. & model (2) T73-P-1 Mfr Pratt & Whitney Spec 2453 Type Axial Weight 925 lb	Mfr's Model: Sikorsky S-64E Missions that may be accomplished with the CH-54A helicopter include: movement of heavy outsized loads, towing of surface vehicles, recovery of downed aircraft, and by use of detachable pods, transportation of personnel, vehicles, and equipment. Since cargo is carried externally by a hoist, the ground crew may load or unload cargo while the helicopter hovers overhead, thereby extending the operational capability into areas unsuitable for landing. Flattopped fuselage serves as a work platform for servicing engines, rotor systems, and main components. This helicopter is of the all-metal, single main rotor type with one anti-torque tail rotor. The two gas turbine engines are located above the fuselage. The wheel-type alighting gear consists of two fixed main gear assemblies and a fixed nose gear assembly. The enclosed cockpit forming the nose of the helicopter carries basic accommodations for pilot, copilot, and an aft facing pilot. Conventional helicopter flight controls are provided for forward facing pilot seats. Automatic stabilization equipment is also provided. The aft facing pilot seat has cyclic and directional trim controls and a conventional collective pitch stick. Cargo handling provisions include a hydraulic powered hoist. Space and structural provisions are also made for a cargo sling or towing assembly.		LB L.F. Empty 19,219 Basic 21,479 Gross (design) 38,000 2.50 Alternate takeoff gross . . 42,000 2.26 Combat 22,764	
ENGINE RATINGS			FUEL AND OIL	
T73-P-1 SHP RPM MIN Military . . . 4500 9000 30 Normal rated . . . 4000 9000 Cont.			Fuel: Grade JP-4 or -5 Spec MIL-T-5624 Qty 1357 (8817 lb. JP-4) Oil: Spec MIL-L-23699 Qty 1.9 gal	
DIMENSIONS			AVIONICS	
Main rotor dia 72 ft Length (rotors operating) 88 ft, 5 in. Length (fuselage) 70 ft, 3 in. Height (static) 25 ft, 5 in. Width (cockpit) 7 ft, 1 in. Tread 19 ft, 9 in. Gnd clearance: Main rotor (idling) . . 16 ft, 8 in. Tail rotor 9 ft, 4 in.	DEVELOPMENT First production acft delivered Nov 66 Production status out of production		Refer to chapter 2.	
	FEATURES	PERSONNEL	ARMAMENT	
	Six-blade main rotor. Rear facing seat for aft pilot/hoist operator A four-point 20,000 lb capacity load suspension system and a 20,000 lb capacity single point cargo hoist. Four-blade, anti-torque tail rotor.	Crew (normal) 3 Pilot 1 Copilot 1 Aft pilot 1 Observers 2 Passengers (with Pod Attached) Troops 45 or Litters 24 and Attendants 3	None.	

1-21. Loading and Performance — Typical Mission, CH-54A (Tarhe).

CONDITIONS	SEA LEVEL STANDARD DAY MISSION I	4000 FOOT 95°F MISSION II	FERRY MISSION III
TAKEOFF WEIGHT ^{5/}	42,000	42,000	30,300
Fuel	2,705	2,695	8,817
Payload (outbound) ^{3/}	17,818	17,828	—
Payload (inbound) ^{3/}	18,803	19,055	—
Takeoff power loading	6.36	6.36	4.59
Disk loading	10.31	10.31	7.44
Max rate of climb at SL ^{1/}	1,350	1,350	2,625
Max rate of climb (one engine out) ^{1/}	450	450	1,525
Service ceiling (100 fpm) ^{2/}	8,000	8,000	—
Service ceiling (one engine out) ^{1/}	2,000	2,000	12,000
RANGE ^{4/}	—	—	241
Average cruising speed	—	—	100
Cruising altitude	—	—	SL
Mission time ^{4/}	—	—	2.5
RADIUS ^{4/}	20	20	—
Average cruising speed	80	80	—
Cruising altitude	2,000	4,000	—
Mission time	0.5	0.6	—
LANDING WEIGHT	21,725	21,715	22,360

^{1/} Military power.^{2/} Normal power.^{3/} Carried by single-point hoist or four-point load suspension system.^{4/} Detailed descriptions of RANGE and RADIUS missions are given in paragraph 1-22.^{5/} Includes crew of 3 at 200 lb. each. Does not include any baggage, Engine Air Particle Separators (EAPS) at 300 lbs., or Passive Defense (Armor) Protection at 1285 lbs.

Performance Basis:

Data Source: Army CH-54A Model Spec. No. SER64509-2.
TM 55-1520-217-10/1 Operator's Manual (CH-54A).

Performance is based on powers shown in paragraph 1-20.

FORMULA: MISSION I (Sea Level, Standard Day)

Warm up for 1 minute, take off at sea level, standard day conditions and climb at BROCC. Cruise out 20 nautical miles at 2000 feet pressure altitude, standard day conditions, to a sea level standard day remote site. Hover for 5 minutes in ground effect while delivering and picking up cargo. Climb at BROCC and cruise back at 2000 feet pressure altitude, standard day conditions, to a sea level standard day home base. Hover for 1 minute in ground effect and deposit cargo. Land with 10% initial fuel reserve.

FORMULA: MISSION II (4000 foot, 95°F)

Warm up for 1 minute, take off at sea level, standard day conditions and climb at BROCC. Cruise out 20 nautical miles to a 4000 foot pressure altitude, 95°F day conditions remote site. Hover for 5 minutes in ground effect while delivering and picking up cargo. Cruise back to a sea level standard day home base. Hover for 1 minute in ground effect and deposit cargo. Land with 10% initial fuel reserve.

FORMULA: MISSION III (Ferry)

Warm up for 1 minute, take off at sea level standard day conditions and cruise out at best range speed until only reserve fuel remains. Land with 10% initial fuel reserve.

1-22. CH-54B (Tarhe) Characteristics.

POWERPLANT				MISSION AND DESCRIPTION		WEIGHTS	
No. & model (2)T73-P-700 Mfr Pratt & Whitney Spec 2456 Type Axial Weight 935 lbs				Mfr's Model: Sikorsky S-64F Missions that may be accomplished with the CH-54B helicopter include: movement of heavy outside loads, towing of surface vehicles, recovery of downed aircraft, and by use of detachable pods, transportation of personnel, vehicles, and equipment. Since cargo is carried externally by a hoist, the ground crew may load or unload cargo while the helicopter hovers overhead, thereby extending operational capability into areas unsuitable for landing. The flat top of the fuselage serves as a work platform for maintenance and servicing of the engines, rotor systems and other components of the power train system. The CH-54B is an all-metal single, main rotor type helicopter with one antitorque tail rotor. It is powered by two gas turbine engines located above the fuselage. The wheel type landing gear consists of two fixed main gear assemblies and a single fixed, fully swiveling nose gear assembly. The fuselage and landing gear are constructed and assembled in a crane configuration. The enclosed cockpit forming the nose of the aircraft has basic accommodations for a pilot, co-pilot, aft-facing pilot and two observers. Conventional helicopter flight controls are provided for the pilot and co-pilot. The aft-facing pilot has electrically operated cyclic and directional trim controls and a conventional collective pitch control. An automatic flight control system (AFCS) is also provided. Cargo handling capabilities consist of a removable single point hydraulic powered four point load suspension system. Provisions are also made for installation of a towing kit.		LB L.F. Empty 19,864 Basic 22,124 Gross (Design) . . 47,000 2.0 Combat 23,409	
ENGINE RATINGS						FUEL AND OIL (USABLE)	
	SHP	RPM	MIN	Fuel: Grade JP-4/5 Spec MIL-T-5624 Qty 1357 gal. (8817 lb. JP-4) Oil: Spec MIL-L-23699 Qty 1.9 gal			
Military	4800	9000	30				
Normal rated	4430	9000	Cont.				
DIMENSIONS				DEVELOPMENT		AVIONICS	
Main rotor dia 72 ft, 3 in. Length: Rotors operating 88 ft, 6 in. Fuselage 70 ft, 3 in. Height (static) 25 ft, 4 in. Width (cockpit) 7 ft, 1 in. Tread 19 ft, 9 in. Gnd clearance: Main rotor (idling) 15 ft, 8 in. Tail rotor 9 ft, 4 in.				First flight June 1969 First production aircraft delivered Dec 1969 Production status Out of production		Refer to chapter 2.	
FEATURES		PERSONNEL		None.			
Six-blade main rotor. Aft-facing pilot/hoist operator. 25,000 lb. capacity four point load suspension system. 25,000 lb. capacity single point hoist. Four-blade anti-torque tail rotor.		Crew (normal) 3 Pilot 1 Co-pilot 1 Aft-pilot 1 Observers 2 Passengers (with pod attached) Troops 45 Litters 24 Attendants 3					

1-23. Loading and Performance Data — Typical Mission, CH-54B (Tarhe)

CONDITIONS	SEA LEVEL STANDARD DAY MISSION I	4000 FOOT 95°F MISSION II	FERRY MISSION III
TAKEOFF WEIGHT ^{5/} .....(lb)	47,000	47,000	29,950
Fuel .....(lb)	3,055	2,590	8,817
Payload (outbound) ^{3/} .....(lb)	21,822	22,286	—
Payload (inbound) ^{3/} .....(lb)	23,000	23,477	—
Takeoff Power Loading .....(lb/bhp)	5.95	5.95	3.79
Disk Loading .....(lb/sq ft)	11.50	11.50	7.36
Max Rate of Climb at SL ^{1/} .....(fpm)	1,350	1,350	2,915
Max Rate of Climb (one engine out) ^{1/} ..(fpm)	490	490	1,890
Service Ceiling (100 fpm) ^{2/} .....(ft)	10,000	10,000	—
Service Ceiling (one engine out) ^{1/} .....(ft)	2,000	2,000	12,000
RANGE .....(nmi)	—	—	228
Average Cruising Speed .....(kn)	—	—	100
Cruising Altitude .....(ft)	—	—	SL
Mission Time .....(hrs)	—	—	2.3
RADIUS .....(nmi)	20	20	—
Average Cruising Speed .....(kn)	85	85	—
Cruising Altitude .....(ft)	2,000	2,000	—
Mission Time .....(hrs)	0.3	0.5	—
LANDING WEIGHT .....(lb)	21,225	19,360	22,005

^{1/} Military power.^{2/} Normal power.^{3/} Carried by single-point hoist or four-point load suspension system.^{4/} Detailed descriptions of RANGE and RADIUS Missions is given below.^{5/} Includes crew of 3 at 200 lbs. each. Does not include any baggage, Engine Air Particle Separators (EAPS) at 300 lbs., or Passive Defense (Armor) Protection at 1285 lbs.

Data Source: Army CH-54B Model Spec No. SER 64279.

TM 55-1520-217-10/2 Operator's Manual (CH-54B).

NOTE

Performance is based on powers shown in paragraph 1-22.

FORMULA: MISSION I (Sea Level, Standard Day)

Warm up for 1 minute, take off at sea level, standard day conditions and climb at BROG. Cruise out 20 nautical miles at 2000 feet pressure altitude, standard day conditions, to a sea level standard day remote site. Hover for 5 minutes in ground effect while delivering and picking up cargo. Climb at BROG and cruise back at 2000 feet pressure altitude standard day conditions to a sea level standard day home base. Hover for 1 minute in ground effect and deposit cargo. Land with 10% initial fuel reserve.

FORMULA: MISSION II (4000 foot, 95°F)

Warm up for 1 minute, take off at sea level, standard day conditions and climb at BROG. Cruise out 20 nautical miles to a 4000 foot pressure altitude, 95°F day conditions remote site. Hover for 5 minutes in ground effect while delivering and picking up cargo. Cruise back to a sea level standard day home base. Hover for 1 minute in ground effect and deposit cargo. Land with 10% initial fuel reserve.

FORMULA: MISSION III (Ferry)

Warm up for 1 minute, take off at sea level standard day conditions and cruise out at best range speed until only reserve fuel remains. Land with 10% initial fuel reserve.

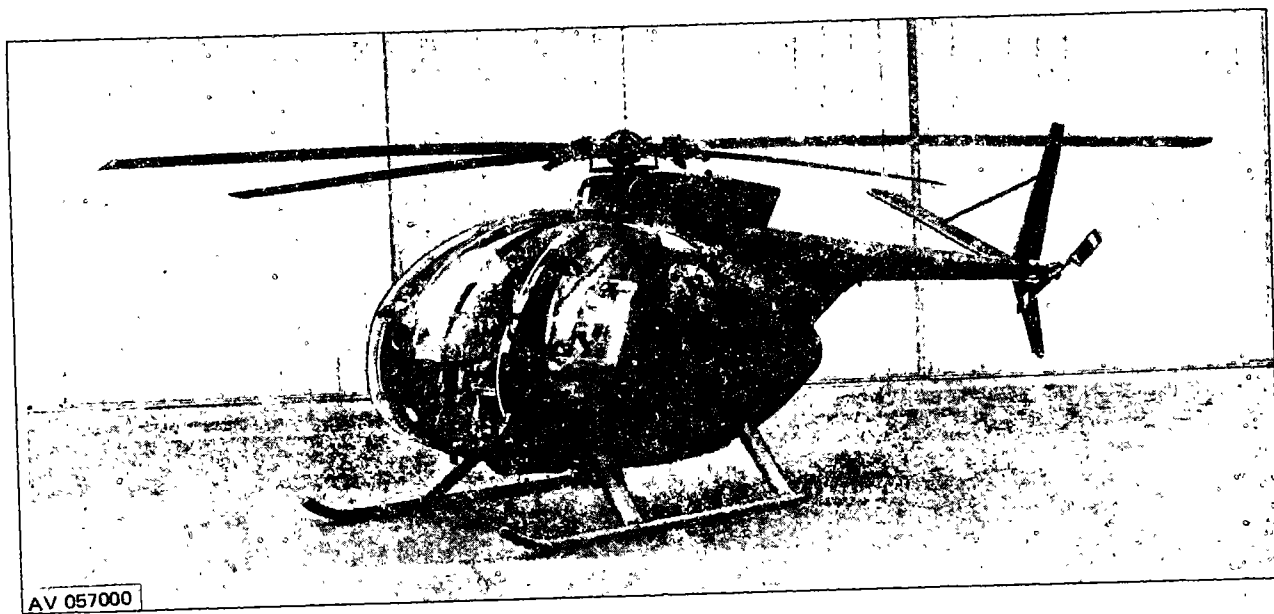


Figure 1-8. OH-6A (Cayuse)

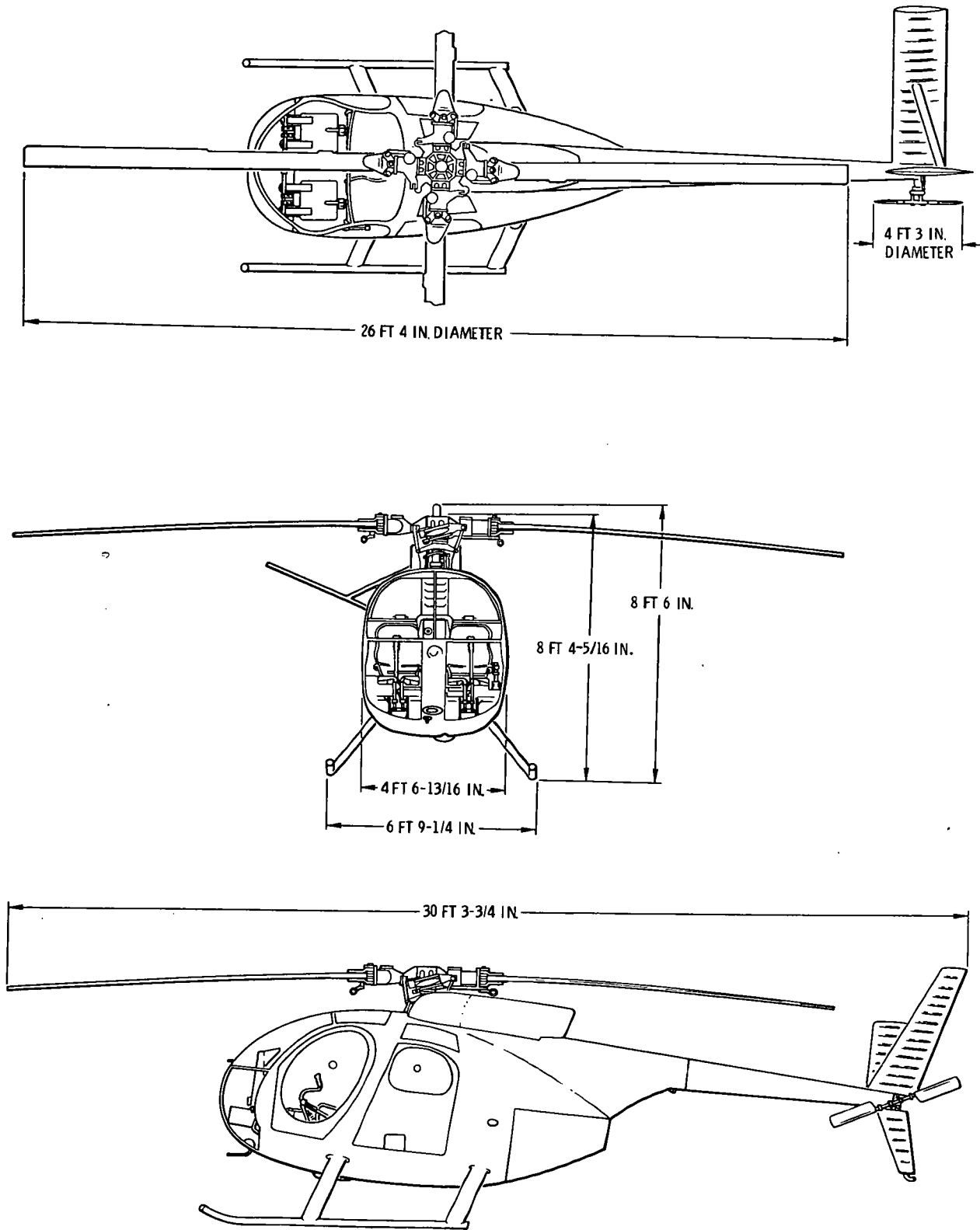


Figure 1-9. Principal dimensions, OH-6A (Cayuse)

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1-24. OH-6A (Cayuse) Characteristics.

POWERPLANT	MISSION AND DESCRIPTION		WEIGHTS
No. & model . . (1) T63-A-5A Mfr Detroit Diesel Allison Div of GMC Engine spec No. 580J, dtd 30 Sept. 1970 . .	Mfr's Model: Hughes 500 The principal missions of the OH-6A light observation helicopter are visual observation and target acquisition, reconnaissance, and command control. This helicopter is employed in support of combat companies, and will operate for extended periods of time with only such support as provided by one mechanic with handtools. Normal operation is limited to day or night visual flight conditions. The light observation helicopter is a single-lifting, 4-blade rotor, 4-place helicopter with a normal gross weight of 2400 lb or less. It is powered by a T63-A-5A free turbine engine with 317 SHP, derated to 252.5 SHP. It incorporates dual flight controls with the secondary cyclic control element easily removable. The flight instruments are limited to those required for day and night marginal visual conditions. The cargo area contains troop-type seats which are easily stowable when not in use.		Empty 1158 Useful load 1242 Pilot 200 Observers (2), Copilot (1) 600 Cargo 42 Fuel 400 Gross (FAA certified) 2400 Max structure 2700
ENGINE RATINGS	DEVELOPMENT		FUEL AND OIL
Ratings Takeoff & mil *317 Normal **270 Output speed SFC lb/ SHP- rpm HR Takeoff & mil 6000 0.697 Normal 6000 0.706 Above ratings developed on standard sea level static conditions. *Derated to 252.5 for 5 min **Derated to 214.5	Design competition initiated October 1960 Flight evaluation completed June 1964 Production contract May 1965 First production acft deliveries September 1966		Fuel: Grade JP-4 Spec MIL-T-5624 Alternate JP-5, MIL-T-5624 Qty 61.5 gal Oil: Spec MIL-L-23699 Alternate MIL-L-7808 No. tanks 1 Location Engine section Qty 3 qt Main Transmission: Spec MIL-L-23699 Alternate MIL-L-7808 Qty 8.0 pt Tail Rotor Transmission: Spec MIL-L-23699 Alternate MIL-L-7808 Qty 0.5 pt
DIMENSIONS	FEATURES	PERSONNEL	AVIONICS
Rotor dia 26 ft, 4 in. Length: Rotor operating 30 ft, 3-3/4 in. Rotor folded . . . 23 ft Height 8 ft, 6 in. Tread 6 ft, 9-1/4 in.	Dual controls. Stowable troop seats.	Crew (normal) 1 Observer 2 Copilot 1	Refer to chapter 2.
			ARMAMENT
			Refer to chapter 2.

1-25. Loading and Performance — Typical Mission, OH-6A (Cayuse).

	BASIC MISSION I	ALTERNATE 1A (CLEAN) II	ALTERNATE 1A (ARMED) III	FERRY RANGE IV	HIGH SPEED SEA LEVEL MISSION V
TAKEOFF WEIGHT (lb)...	2159	2400	2400 ^{6/}		2159
Fuel (lb)...	400	400	400		400
Payload (not including pilot) (lb)...	400	637 ^{4/}	400		400
Takeoff power loading (lb/bhp)...	8.55	9.50	9.50		8.55
Disk loading (lb/sq ft)...	3.96	4.41	4.41		3.96
Speed for Min. R/D (knots)...	54.0	54.0	54.0		54.0
Max rate of climb at sea level ^{1/} (fpm)...	1925	1560	1560		1925
Speed for max R/C, sea level ^{1/} (knots)...	56.0	58.0	58.0		56.0
Time: Sea level to 5000 ft ^{1/} (minutes) ..	2.5	3.3	3.3		2.5
Time: Sea level to 10,000 ft ^{1/} (minutes) ..	5.3	7.0	7.0		5.3
Service ceiling (100 fpm) ^{2/} (ft)...	18,400	15,850	15,850		18,400
Absolute hover ceiling ^{1/} (ft)...	11,200	6,500	6,500		11,200
COMBAT RANGE (nmi)...	370	330	316		294
Average cruising speed ^{7/ 8/} (knots)...	104	102	100		130
Cruising altitude (ft)...	12,200	9600	9500		SL
Total mission time (hr)...	3.6	3.3	3.2		2.3
COMBAT RADIUS (nmi)...	185	165	158		147
Average cruising speed ^{7/ 8/} (knots)...	104	102	100		130
Cruising altitude (ft)...	12,200	9600	9500		SL
Mission time (hr)...	3.6	3.3	3.2		2.3
COMBAT WEIGHT ^{3/} (lb)...	1961	2207	2208		1977
COMBAT ALTITUDE (ft)...	12,200	9600	9500		SL
Combat speed ^{1/} (knots)...	116	112	112		130
Combat climb ^{1/} (fpm)...	1860	1680	1680		2220
Service ceiling ^{2/} (ft)...	20,950	17,850	17,850		20,750
Absolute hover ceiling ^{1/} (ft)...	14,400	10,500	10,500		14,100
Max rate of climb @ sea level ^{1/} (fpm)...	2250	1860	1860		2220
Speed for max R/C, sea level (knots)...	55	56	56		55
Maximum speed ^{7/ 8/} (knots)...	104	102	100		130
Basic speed at 5000 ft ^{7/} (knots)...	117	113	110		
LIMIT FLIGHT LOAD FACTORS					
Maneuver Positive (g)...	2.82	2.54	2.54		2.82
Maneuver Negative (g)...	0.50	0.50	0.50		0.50

^{1/}Takeoff power up to 5 minutes.^{2/}Normal power.^{3/}For RADIUS mission.^{4/}Includes copilot at 200 lbs.

1-25. Loading and Performance – Typical Mission, OH-6A (Cayuse) (CONT).

5/Includes 4 Mark XII torso tanks with an empty weight including trapped fuel of 19.5 lb/tank.

6/Includes XM-27 or XM-27E-1 Armament Kit.

7/Limited by V_{ne} .

8/At combat altitude and combat weight.

Performance Basis:

- a. Army flight test YOH-6A extrapolated.
- b. All performance is out of ground effect and for standard atmospheric conditions. Speeds given are true airspeed.

1-26. Performance Notes, OH-6A (Cayuse).

FORMULA: RADIUS MISSION I, II, & III

Warm up, take off, climb on course at military power to altitude for best range at average cruise weight. Cruise to remote base at speed for best range. Do not land. Return to home base. Range-free allowances are 2 minutes of normal power for warmup and 10 percent of initial fuel for reserves.

FORMULA: RANGE MISSION I, II, & III

Warm up, take off, and climb on course at military power to altitude for best range at average cruise weight. Cruise to remote base at speed for best range. Range-free allowances are 2 minutes of normal power for warmup and 10 percent of initial fuel for reserve.

FORMULA: FERRY RANGE MISSION IV

Warm up, take off, and climb on course at military power to 5,000 feet. At steady cruise, climb to stay at optimum altitude as weight decreases. Range-free allowance is 2 minutes of normal power for warmup. No reserve fuel allowance.

FORMULA: RADIUS MISSION V

Warm up, take off, and accelerate to maximum speed. Cruise at sea level at maximum speed, as limited by normal power or V_{ne} to remote base. Do not land. Return to home base. Range-free allowances are 2 minutes of normal power for warmup and 10 percent of initial fuel for reserve.

FORMULA: RANGE MISSION V

Warm up, take off, and accelerate, to maximum speed. Cruise at sea level at maximum speed, as limited by normal rated power V_{ne} to remote base. Range-free allowances are 2 minutes of normal power for warmup and 10 percent of initial fuel for reserve.

GENERAL DATA

For detailed planning refer to applicable technical manual.

PERFORMANCE REFERENCE

Hughes Tool Company-Standard Aircraft Characteristics (OH-6A).

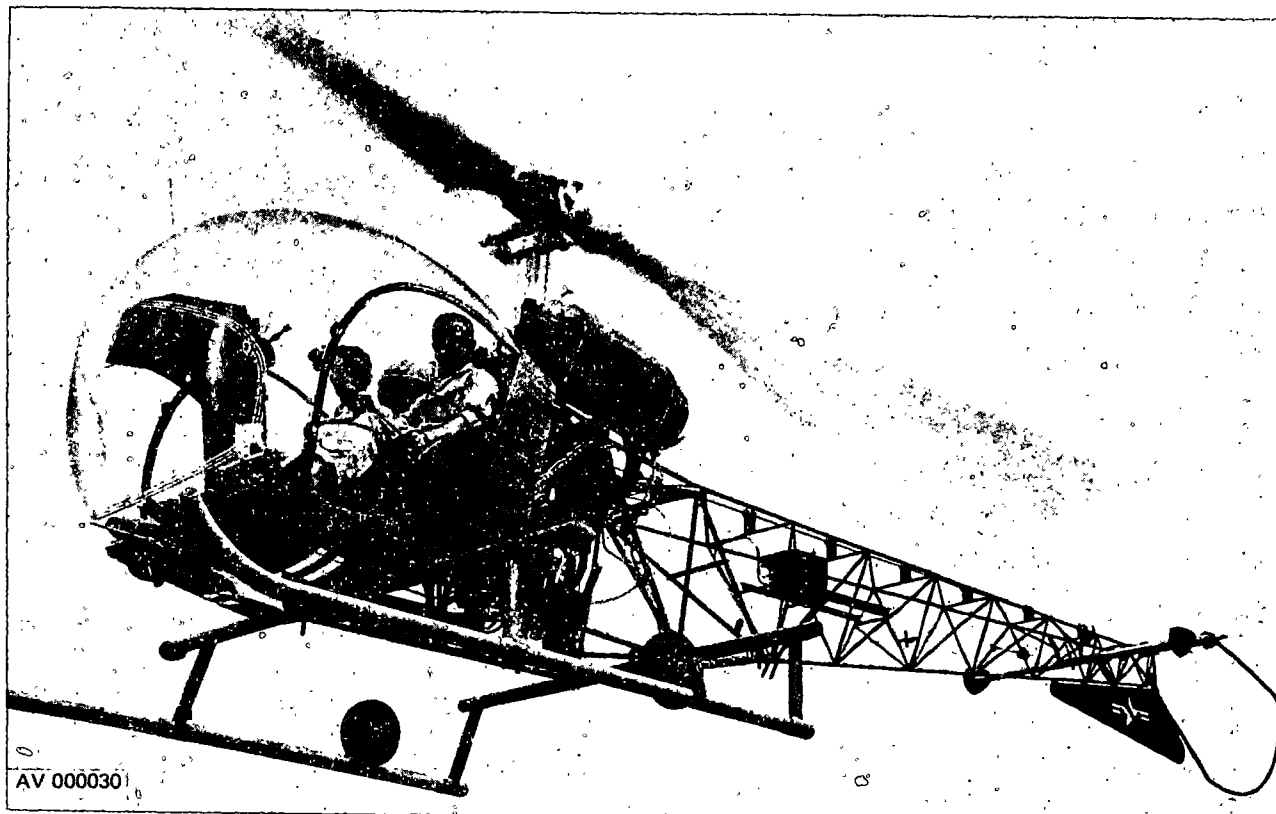
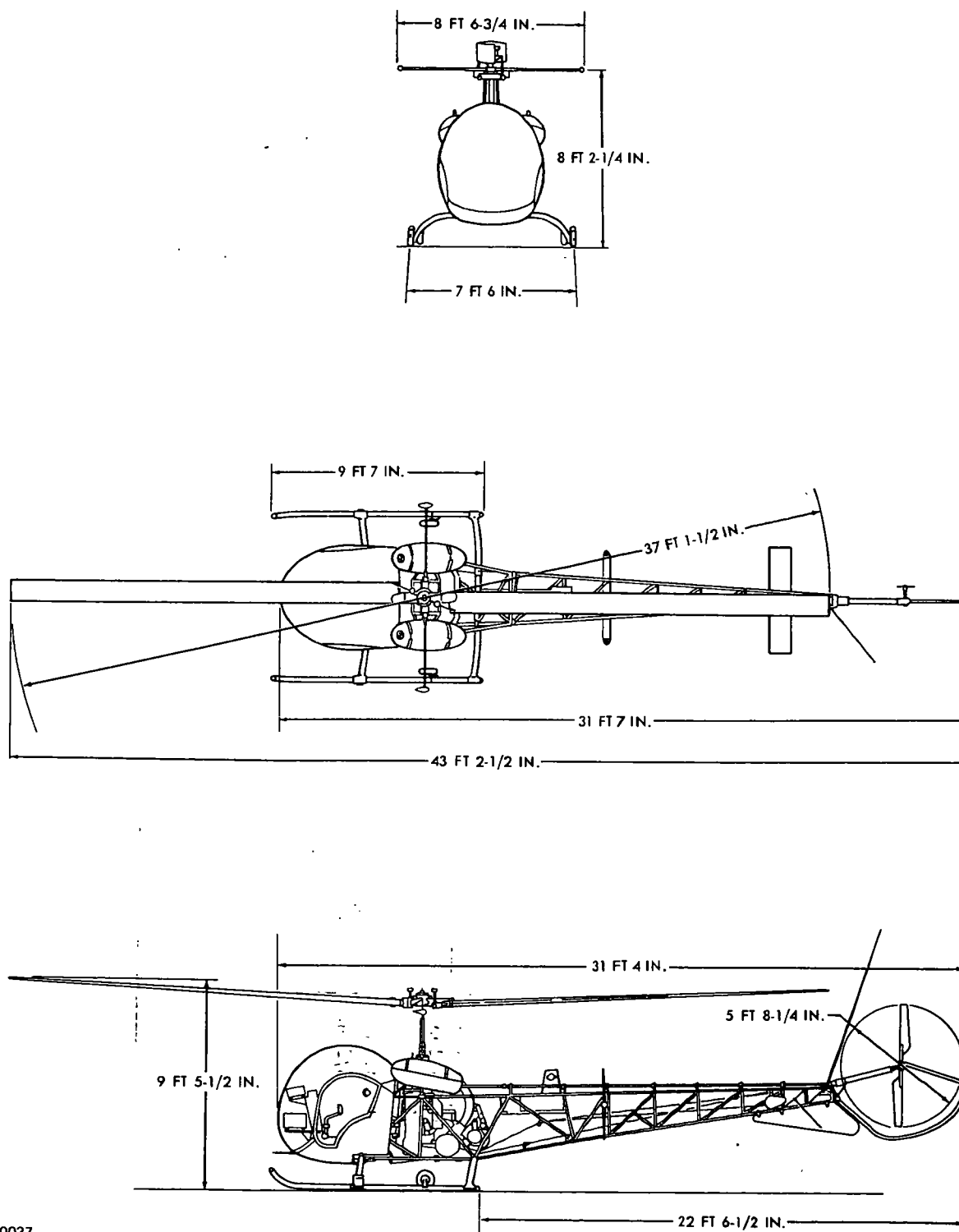


Figure 1-10. OH-13S (Sioux) Typical



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Figure 1-11. Principal dimensions, OH-13S (Sioux)

1-27. OH-13S (Sioux) Characteristics.

POWERPLANT	MISSION AND DESCRIPTION		WEIGHTS	
No. & model . . (1) O-435-25A Mfr Lycoming Engine spec No. 2354 Red. gear ratio . D.D.	Mfr's Model: Bell 47G3-B The principal missions of the OH-13S are observation, reconnaissance, and general utility. The OH-13S incorporates a 2-blade main rotor and a 2-blade tail rotor with a hydraulically boosted cyclic control system. The fuselage is an open-tube configuration with a bubble-type cockpit enclosure. The landing gear is of the skid-type, with ground handling wheels attached.		LB L.F. Empty (actual) 1980 Design 2850 2.5	
ENGINE RATINGS	DEVELOPMENT		FUEL AND OIL	
BHP RPM ALT MIN Takeoff 270 3200 SL 5 Normal 220 3200 SL Cont.	Similar to the OH-13H except for the O-435-25A turbocharged engine in lieu of the naturally aspirated O-435-23C engine. Main rotor diameter has been increased 2 feet. Increased main rotor disk matches rotor with engine for higher altitude performance, more maneuverability, and less susceptibility to turbulence. Gross weight of the OH-13S has been increased to 2850 lb and fuel capacity increased to 57 gal.		Fuel: Grade 115/145 Spec MIL-G-5572 No. tanks 2 Location Fuselage Qty 57 gal Oil: Spec Temps above +30°F MIL-L-22851 Type II Temp below +30°F MIL-L-22851 Type III No. tanks 1 Location Engine section Qty 3-1/2 gal	
DIMENSIONS	FEATURES	PERSONNEL	AVIONICS	
Rotor dia 37 ft, 1-1/2 in. Length: Rotors operating . . 43 ft, 2-1/2 in. Rotors static . 43 ft, 2-1/2 in. Fuselage 31 ft, 7 in. Span (max lateral) 8 ft, 6-3/4 in. Height 9 ft, 5-1/2 in. Tread 7 ft, 6 in. Rotor gnd clearance (static) 8 ft, 8-1/2 in. (idling) 8 ft, 8-1/2 in.	Dual controls (prov). Night flying equipment. M2 armament subsystem. Extended range torso tank (prov).	Crew (normal) 1 Passengers/observers *2 *Limited to 1 when dual controls are installed.	Refer to chapter 2.	
			ARMAMENT	
			Refer to chapter 2.	

1-28. Loading and Performance — Typical Mission, OH-13S (Sioux).

Mission weight (lb)	2850
Empty weight (lb)	1980
Useful load (lb)	.870
Fuel load (lb)	.342
Oil load (lb)	22
Payload (lb)	.510
Max endurance at sea level (hr)	3.7
Max range at 5000 ft (miles)	.203
Max R/C (ft/min)	.975
HOGE ceiling (ft)	10,800
HIGE ceiling (ft)	12,000+
Service ceiling (ft)	12,000+
Takeoff power (hp)	.270
Military power (hp)	.220
Cont power (hp)	.220
Turbocharged	yes
Speed- V_{ne} (kn)	91
Main rotor	
Disk area (sq ft)	1085
Blade area (sq ft)	.34.27
Disk load (psf)	2.63
Blade load (psf)	83.2
Solidity	0.0314
Tip speed (fps) (3200 rpm)	.695
Tail rotor	
Disk area (sq ft)	26.8
Blade area (sq ft)	2.4
Solidity	0.0895
Tip speed (fps)	.587



Figure 1-12. OH-58A, Light observation helicopter (Kiowa)

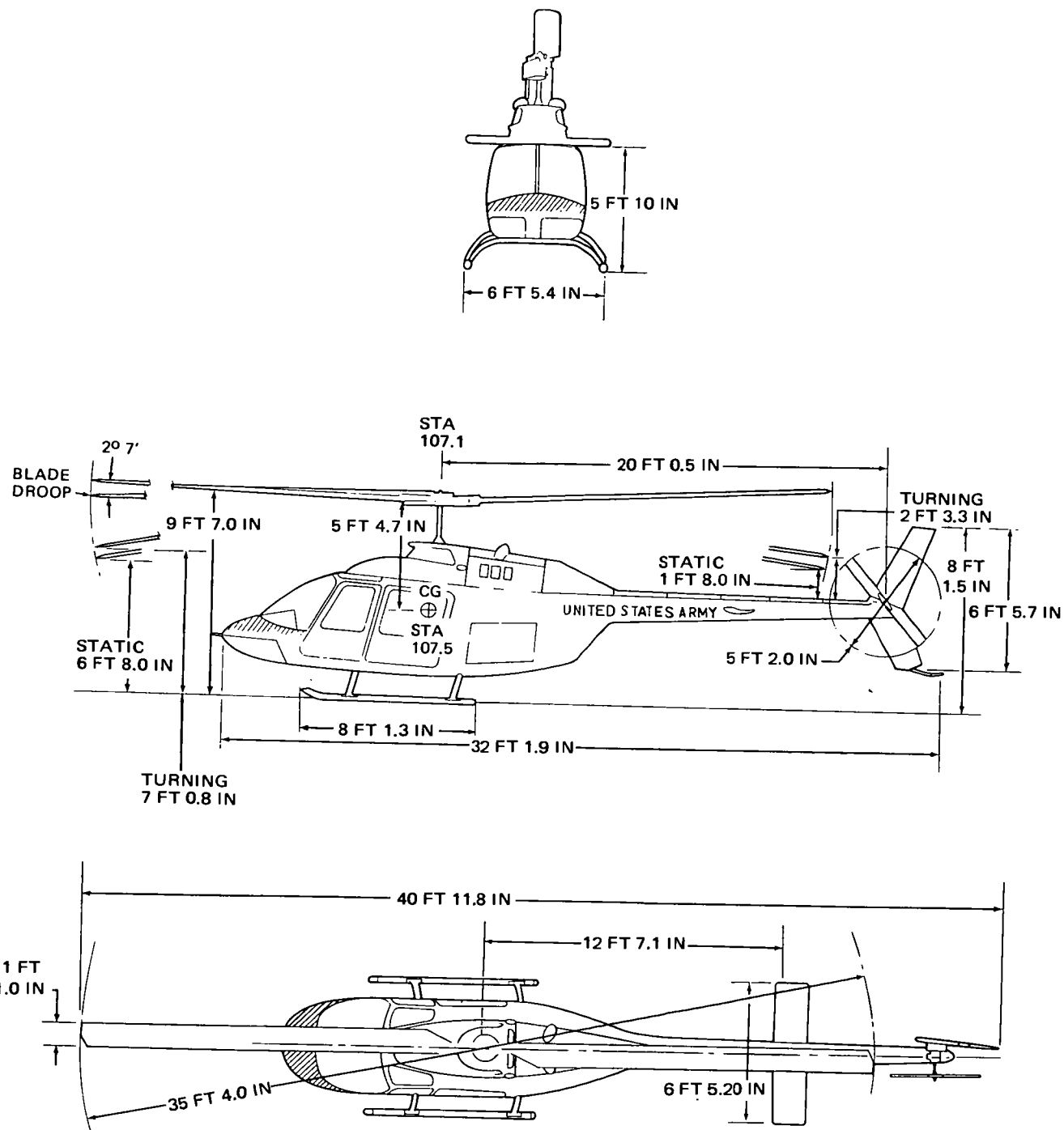


Figure 1-13. Principal dimensions, OH-58A (Kiowa)

1-29. OH-58A (Kiowa) Characteristics.

POWERPLANT	MISSION AND DESCRIPTION		WEIGHTS	
No. & model . . (I) T63-A-700 Mfr Allison Corp. Engine spec. no. 803-F Amend- ment 1 Type Axial-centrifugal compressor, free turbine Length 41 in. Width 15.5 in. Height 18 in. Weight 135 lbs. Helicopter rotor gear ratio . . . 17.44:1	Mfg's Model: Bell 206A The missions for which the OH-58A Helicopter are employed are: visual observation, target acquisition, reconnaissance, and command control. The helicopter is readily adaptable to utility tasks at the combat company level without use of special kits or special attachments. The helicopter is organic to division, brigade, battalion, or equivalent level, and capable of continuous daily operation in the forward area, with maximum availability to the tactical commander. Normal operation is limited to day and night visual and marginal visual flight conditions. The OH-58A can perform an unarmed observation mission with a 260-mile range or 3.0-hour endurance at a takeoff gross weight of 2760 pounds. It can perform a scout mission, armed with the XM-27E-1 weapon system and 2000 rounds of ammunition, with a range at 230 miles at a takeoff gross weight of 2967 pounds. This helicopter is the single engine, single main rotor type. The fuselage is divided into three main sections; the forward section which provides the cabin and fuel cell enclosures as well as the pylon support, the intermediate section which supports the engine provides the equipment and electronics compartments, and the tail boom which supports the horizontal stabilizer, the vertical stabilizer, and the tail rotor. The free turbine engine is mounted aft of the main rotor horizontally on top of the fuselage. The landing gear is the shock-absorbing skid type.		LOADING LB L.F. Empty 1586 Empty (with armor) 1807.6 Basic 1766.2 3.50 Design 3000 2.50 Combat Unarmed mission 2842.7 2.64 Armed mission . . 3000 2.50 Max structural . . 3000 2.50	
ENGINE RATINGS			FUEL AND OIL	
Standard Sea Level Static Conditions SHP RPM DUR Takeoff 317 6000 5 min. Normal 270 6000 Cont.* *Derated for Transmission			Fuel: Grade JP-4 Spec MIL-T-5624 Alternate . . . JP-5, MIL-T-5624 Emergency . . . MIL-G-5572 w/o TCP No. Tanks . . . 1 Location . . . Fuselage Qty 73 gal Oil: Engine Spec MIL-L-23699 Alternate . . . MIL-L-7808 No. Tanks . . . 1 Location . . . Fuselage Transmission: Spec MIL-L-23699 Alternate . . . MIL-L-7808 M/R Hub . . . 10-W-30 Spec MIL-L-2104	
DIMENSIONS	DEVELOPMENT			
Rotor dia 35 ft, 4 in. Length: Rotors operating . . . 40 ft, 11.8 in. Blades removed 32 ft, 1.9 in. Height: To top of rotor fairing . . 9 ft, 7.0 in. Tread of skids . . . 6 ft, 5.4 in. Main rotor: Disk area 979.8 sq. ft. Blade area 38.26 sq. ft. Tail rotor: Disk area 20.97 sq. ft. Blade area 2.26 sq. ft.	First production article May 1969			
	FEATURES	PERSONNEL	AVIONICS	
	Dual controls Rear seat palletized Cargo platform Two bladed seesaw rotor system	Crew (normal) 1 Observer 2 Copilot 1	Refer to chapter 2.	
			ARMAMENT	
			Refer to chapter 2.	

1-30. Loading and Performance – Typical Mission, OH-58A (Kiowa).

CONDITIONS	I	II
	BASIC MISSION (Unarmed Observation)	ALTERNATE (Armed Scout)
TAKEOFF WEIGHT	2760	2967 ^{4/}
Fuel	455	428
Payload	170	298
Takeoff Power Loading	9.15	9.84
Disk Loading	2.82	3.03
Speed for Min. R/D	49	49
Vertical Rate of Climb @ Sea Level ^{1/}		
Max Rate of climb @ Sea Level ^{1/}	1780	1600
Speed for Max R/C @ Sea Level	48	50
Time Sea Level to 5000 ft. ^{1/}	3.5	4.0
Time Sea Level to 10,000 ft. ^{1/}	7.5	8.5
Service Ceiling (100 fpm) ^{2/}	19,000	17,200
Absolute Hover Ceiling ^{1/}	8,000	5,400
COMBAT RANGE	260	230
Average speed	102	120
Cruising Altitude	14,000	10,000
Total Mission Time	2.98	2.47
COMBAT RADIUS	147	121
Average Speed	102	102
Cruising Altitude	14,000	12,200
Total Mission Time	2.98	2.47
COMBAT WEIGHT ^{3/}	2550	2770
Combat Altitude	14,000	10,000
Combat Speed	87	99
Combat Climb ^{1/}	1090	1120
Service Ceiling ^{3/}	21,000	19,500
Absolute Hover Ceiling	10,600	8000
Max R/C @ Sea Level ^{1/}	1750	1600
Speed for Max R/C	48	50
Max Speed @ Sea Level	120	120
Basic Speed @ 5000 ft.	114	114

^{1/} Takeoff power up to 5 minutes.^{2/} Normal Power.^{3/} For Radius Mission.^{4/} Includes XM-27E-1 Armament Kit.

Performance Basis: Bell flight test 206A MOD.

All performance is out of ground effect and for standard atmospheric conditions.

1-31. Performance Notes, OH-58A (Kiowa).

RADIUS MISSION – I & II

RANGE MISSION – I & II

Warmup – Two minutes at normal power at sea level

Takeoff and Climb – On course at military power to altitude for best range at average cruise weight

Cruise – At speed for best range

Reserve – 10% takeoff fuel

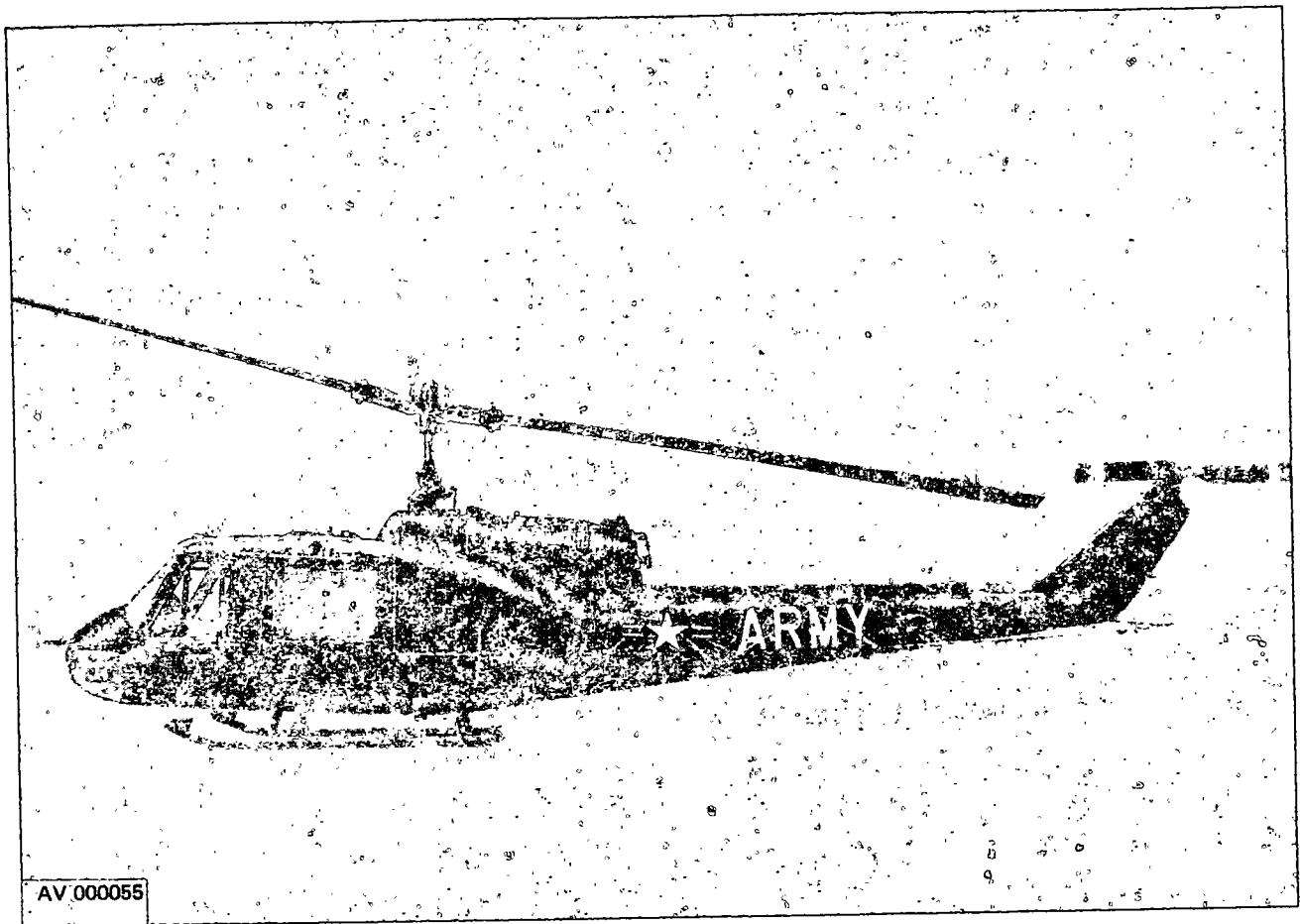


Figure 1-14. UH-1B (Iroquois)

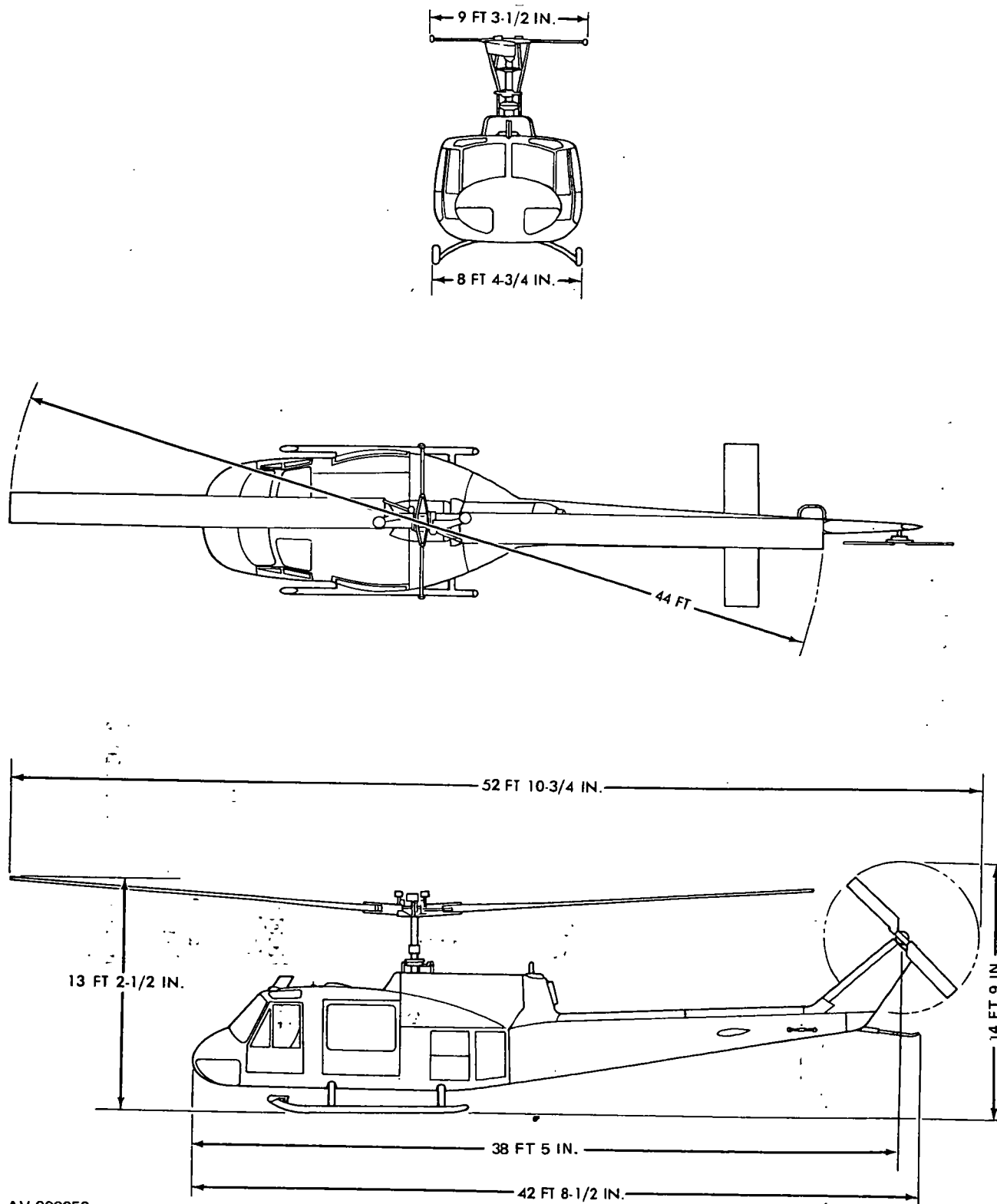


Figure 1-15. Principal dimensions, UH-1B (Iroquois)

1-32. UH-1B (Iroquois) Characteristics.

POWERPLANT				MISSION AND DESCRIPTION		WEIGHTS	
No. & Model . . (1) T-53-L-9A/11/-11B/-11C/-11D Mfr Lycoming Type Free power turbine Red. gear ratio . 0.3119 Tailpipe Fixed area Augmentation . None				Mfr's Model: Bell 204 The principal missions of the UH-1B are the transport of personnel, special teams or crews, equipment, supplies, and to serve as an aerial weapons platform. Universal pylons are attachable to the aircraft to serve as mounts for weapons or external fuel tanks. It may also be used for medical evacuation and as an instrument trainer. These missions may be performed from prepared or unprepared takeoff and landing areas, under instrument operations including light icing, and day or night flight. The gas-turbine-powered UH-1B is of compact design having a low silhouette. The two-bladed main rotor and the two-bladed tail rotor are of all-metal construction. The fuselage is of semimonocoque construction. Sliding cabin doors allow straight-through loading. Litters may be loaded from either side or both sides simultaneously. The cargo floor is knee-high to facilitate loading. The copilot's controls are removable, thus providing accommodations for a passenger in the copilot's seat or, when the copilot's seat is removed, additional cargo area. Some UH-1B's, have complete provisions for a variable speed, power-driven hoist supported by a swing boom, capable of lifting personnel or up to 600 pounds of cargo.		Empty (calculated) 4557 Basic 4825 Design 6600 3.0 Combat *6596 3.0 Max takeoff 8500 2.3 Max landing 8500 *For basic mission.	
ENGINE RATINGS				DEVELOPMENT		FUEL AND OIL	
T53-L-9/11 Rating/SL SHP SFC Output RPM Max (takeoff) 960 0.694 6607 Mil 900 0.702 2207 NRP 825 0.715 6607						Fuel: Grade JP-4/5 Spec MIL-T-5624 No. tanks: Fuselage (2) 165 gal Ferry (1) 350 gal Total qty 515 gal Oil: Spec MIL-L-7808 or MIL-L-23699 No. tanks 1 Location Fuselage Qty 3-1/4 gal	
DIMENSIONS				CAPACITIES		PERSONNEL	
Rotor dia 44 ft Length: Rotors operating 53 ft Rotors static . . . 53 ft Fuselage 42 ft, 8-1/2 in. Span (max lateral) 9 ft, 3-1/2 in. Height 14 ft, 8-1/2 in. Tread 8 ft, 4-3/4 in. Rotor gnd clearance: (static) 7 ft, 4-3/4 in.				Date of contract December 1960 First flight March 1960 First delivery December 1961 Inside clearance Cargo area: Length (overall) . . . 4 ft Width (floor level) . . 6 ft, 8-1/2 in. Height (max) 4 ft Copilot area: Length (overall) . . . 4 ft, 7 in. Width (floor level) . . 2 ft, 7 in. Height (max) 4 ft Main cargo door Height (max) 4 ft Width (max) 4 ft Limit floor loads (overall) Cargo area 300 lb/sq ft Copilot area 75 lb/sq ft Usable cubage Cargo area 140 cu ft Copilot area 20 cu ft		Basic mission Crew (pilot and medical attendant) 2 Litters 3 Transport mission Crew 1 Passengers 4 Alternate Crew 1 Passengers 7 Trainer Crew (instructor & student) 2 Ferry Crew 1	
						AVIONICS	
						Refer to chapter 2.	
						ARMAMENT	
						Refer to chapter 2.	

1-33. Loading and Performance – Typical Missions, UH-1B (Iroquois).

CONDITIONS	TRANSPORT (CARGO OR PASSENGER)	ARMED ^{12/}	INSTRUMENT TRAINER	FERRY
TAKEOFF WEIGHT (lb) ...	6762	7500	6088 ^{5/}	8390 ^{6/}
Fuel at 6.5 lb/gal (grade JP-4) (lb) ...	1073	1073	1073 ^{7/}	3348 ^{7/}
Payload (outbound) (lb) ...	800	0	0	0
Payload (inbound) (lb) ...	0	0	0	0
Takeoff power loading ^{8/} (lb/bhp) ...	7.04	6.86	6.34	8.74
Disk loading (lb/sq ft) ...	4.45	4.35	4.00	5.52
Autorotation speed (min R/D) (kn) ...	57.0	56.5	55.6	60.1
Takeoff ground run at SL ^{1/} (ft) ...	0	0	0	0
Takeoff to clear 50 ft ^{1/} (ft) ...	0	0	0	0
Vertical rate of climb at SL ^{1/} (fpm) ...	1610	1780	2330	....
Maximum rate of climb at SL ^{2/} (fpm) ...	1910	2010	2300	1250
Speed for max R/C at SL (kn) ...	57.0	56.5	55.6	60.1
Time: SL to 5000 ft ^{2/} (min) ...	2.7	2.5	2.3	4.6
Time: SL to 10,000 ft ^{2/} (min) ...	6.0	5.4	4.9	 ^{11/}
Service ceiling (100 fpm) ^{2/} (ft) ...	18,000	17,000	20,200	8800
Absolute hovering ceiling ^{1/} (ft) ...	11,500	12,400	14,900	....
COMBAT RANGE ^{10/} (nmi) ...	230	210	218	695
Average cruise speed (kn) ...	106	90	106	103.4
Initial cruising altitude (ft) ...	2000-4000	2000-4000	2000-4000	2000-4000
Final cruising altitude (ft) ...	2000-4000	2000-4000	2000-4000	2000-4000
Total mission time (hr) ...	2.25	2.45	2.12	6.88
COMBAT RADIUS ^{10/} (nmi) ...	112.7	94.5	98.8	....
Average cruise speed (kn) ...	106	90	106	....
Cruising altitude (outbound) (ft) ...	2000-4000	2000-4000	2000-4000	....
Cruising altitude (inbound) (ft) ...	2000-4000	2000-4000	2000-4000	....
Total mission time (hr) ...	2.22	2.4	1.95	....
FIRST LANDING WEIGHT ^{3/} (lb) ...	6253	6145	5631	....
Ground roll at SL (ft) ...	0	0	0	....
Total from 50 ft (ft) ...	0	0	0	....
COMBAT WEIGHT ^{3/} (lb) ...	5453	7241	5631	5377
Combat altitude (ft) ...	2000-4000	2000-4000	2000-4000	2000-4000
Combat speed (kn) ...	106	100	106	106
Combat climb ^{2/} (fpm) ...	2190	1590	2050	2220
Combat ceiling (500 ft/min) ^{2/} , ^{12/} (ft) ...	22,400	15,400	21,400	22,600

1-33. Loading and Performance – Typical Missions, UH-1B (Iroquois) (CONT).

CONDITIONS	TRANSPORT (CARGO OR PASSENGER)	ARMED ^{12/}	INSTRUMENT TRAINER	FERRY
Service ceiling (100 ft/min) ^{2/, 12/} (ft) ...	23,100	16,000	22,200	23,250
Absolute hovering ceiling ^{1/, 12/} (ft) ...	18,200	9000	16,800	18,500
Takeoff ground run at SL ^{1/} (ft) ...	0	0	0	0
Takeoff to clear 50 ft ^{1/} (ft) ...	0	0	0	0
Maximum rate of climb at SL ^{2/} (fpm) ...	2740	1740	2620	2810
Speed for max R/C at SL (kn) ...	54.2	58.0	54.6	54.1
Max speed at SL ^{4/} (kn) ...	120	105	120	120
Basic speed at 5000 ft ^{4/} (kn) ...	117.5	100	117.5	117.5
LANDING WEIGHT ^{3/} (lb) ...	4996	5639	5188	5377
Ground roll at SL (ft) ...	0	0	0	0
Total from 50 ft (ft) ...	0	0	0	0

^{1/} Takeoff power.

^{2/} Normal rated power.

^{3/} For RADIUS mission if radius is shown.

^{4/} V_{ne} limit.

^{5/} Includes crew of 2 at 400 lb.

^{6/} Includes crew of 1 at 200 lb.

^{7/} Includes 1 x 350 gallon tank.

^{8/} Based on engine specification; takeoff shaft horsepower available.

^{9/} Three 250-lb litter patients.

^{10/} Detailed descriptions of RADIUS and RANGE missions are given in paragraph 1-48.

^{11/} Above service ceiling.

^{12/} Armed W/M-21 subsystem.

Performance Basis:

- Power required based on FTC-TDR-62-21, "YUH-1B Category II Performance Tests."
- Power available and fuel flow are based on Lycoming Model Specification No. 104. 16-B.
- All data are at 6600 engine rpm.
- Except for Ferry Mission, data do not include ground effect.

1-34. Performance Notes, UH-1B (Iroquois).

FORMULA: RADIUS MISSION I

Warm up, take off, climb on course to 2000-4000 feet at normal power, proceed at cruise speeds to remote base, and land. Without refueling, warm up, take off, climb on course to 2000-4000 feet at normal power, and return at cruise speeds. Range-free allowances are 4 minutes of normal power for warmups and takeoffs plus 10 percent of initial fuel for reserve.

FORMULA: RADIUS MISSION II

Warm up, take off, climb on course to 2000-4000 feet at normal power, proceed at cruise speeds to remote base, and land. Without refueling, warm up, take off, climb on course to 2000-4000 feet at normal power, and return at cruise speeds. Range-free allowances are 4 minutes of normal power for warmups and takeoffs plus 10 percent of initial fuel for reserve.

FORMULA: RADIUS MISSION III

Warm up, takeoff, climb on course to 2000-4000 feet at normal power, proceed at cruise speeds to remote base, and land. Without refueling, warm up, take off, climb on course to 2000-4000 feet at normal power, and return at cruise speed. Range-free allowances are 10 minutes of normal power for warmups and takeoffs plus 20 minutes at speeds for maximum endurance at sea level, plus 5 percent of initial fuel for reserve.

FORMULA: RANGE MISSION II

Warm up, take off, climb on course to 2000-4000 feet at normal power, and proceed at cruise speeds until 90 percent of initial fuel is consumed. Range-free allowances are 2 minutes of normal power for warmup and takeoff plus 10 percent of initial fuel for reserve.

FORMULA: RANGE MISSION III

Warm up, take off, climb on course to 2000-4000 feet initial altitude at normal power, proceed at cruise speeds to remote base, and land. Range-free allowances are 5 minutes of normal power for warmup and takeoff, plus 20 minutes at speeds for maximum endurance at sea level, plus 5 percent of initial fuel for reserve.

FORMULA: RANGE MISSION IV

Warm up, take off, climb on course to 2000-4000 feet initial altitude at normal power, maintain 30 feet per minute rate of climb to final altitude of 2000-4000 feet, and proceed at cruise speeds until 90 percent of initial fuel is consumed. Range-free allowances are 2 minutes of normal power for warmup and takeoff plus 10 percent of initial fuel for reserve.

GENERAL NOTES

a. Cruise speed as used above denotes airspeed for long-operation or maximum permissible speed, whichever is lower.

b. Except for ferry mission takeoff, data do not include ground effect.



Figure 1-16. UH-1C and M (Iroquois)

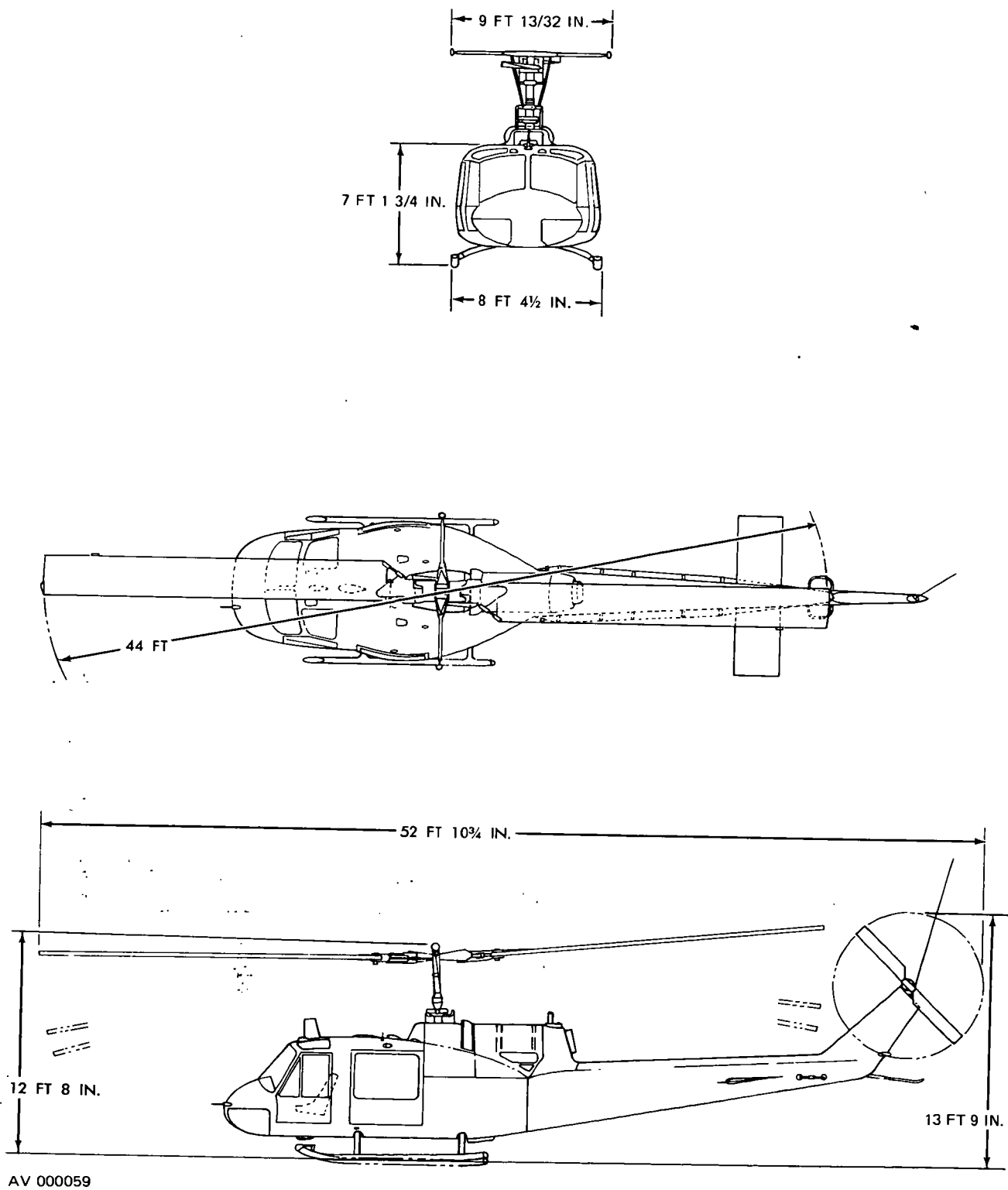


Figure 1-17. Principal dimensions, UH-1C and M (Iroquois)

1-35. UH-1C/M* (Iroquois) Characteristics.

POWERPLANT				MISSION AND DESCRIPTION		WEIGHTS					
No. & model (1) T53-L-9A/-11/-11B/-11C/-11D				Mfr's Model: Bell		Empty	LB L.F.				
Mfr Lycoming				The principal missions of the UH-1C helicopter are transporting personnel, special teams or crews, equipment and supplies; medical evacuation; ambulance service; reconnaissance and security; point target and area fire by attachment of appropriate weapons; and instrument trainer. These missions may be performed from prepared or unprepared takeoff and landing areas, under instrument operations including light icing, and day or night flight. Navigation may be by dead reckoning or by use of radio aids. The main difference between the UH-1C and UH-1B is the main rotor system. The UH-1C has the 540 rotor system which has a flexure plate, hinge-half type hub and a wider cord blade. The 540 rotor system provides a more stable gun platform, higher maximum gross weight, and higher forward speed. Some UH-1C's have complete provisions for a variable speed, power driven hoist supported by a swing boom, capable of lifting personnel or up to 600 pounds of cargo.		Gross	9500				
Engine spec No . . . 104.22-B & .28						FUEL AND OIL					
Type Free power turbine						Fuel:					
Red. gear ratio . . . 0.3119						Grade JP-4/5					
Tailpipe Fixed area						Spec MIL-T-5624					
Augmentation None						Qty 242 gal					
						Oil:					
						Spec MIL-L-7808					
						or					
						MIL-L-23699					
						Qty-Engine 4 gal					
						Qty-Transmission and gear boxes 2.8 gal					
ENGINE RATINGS				DEVELOPMENT		AVIONICS					
T53-L-9/11				Contracting agency AVSCOM		Refer to chapter 2.					
				Delivery schedule June 1965 thru November 1967							
				CAPACITIES	PERSONNEL	ARMAMENT					
Rating/SL				Cargo area: Length (overall) . . 4 ft Width (floor level) 6 ft. 8-1/2 in. Height (max) . . . 4 ft	Basic mission Crew (pilot and medical attendant) 2 Litters 3 Transport mission Crew 1 Passengers 4 Alternate Crew 1 Passengers 7 Trainer Crew (instructor & student) 2 Ferry Crew 1	All metal, semi-rigid rotor, skid-type landing gear.					
Max (takeoff)											
Mil											
NRP											

*UH-1M incorporates the T53-L-13 engine.

1-36. Performance — Typical Mission, UH-1C (Iroquois).

Takeoff distance	(ft)	0
Rate of climb	(fpm)	2,420
Service ceiling	(ft)	21,100
Cruise speed ^{1/}	(kn)	92-110
Max speed	(kn)	140
Range	(nmi)	300
Landing distance	(ft)	0

^{1/}Normal rated power (6600 rpm) at sea level.

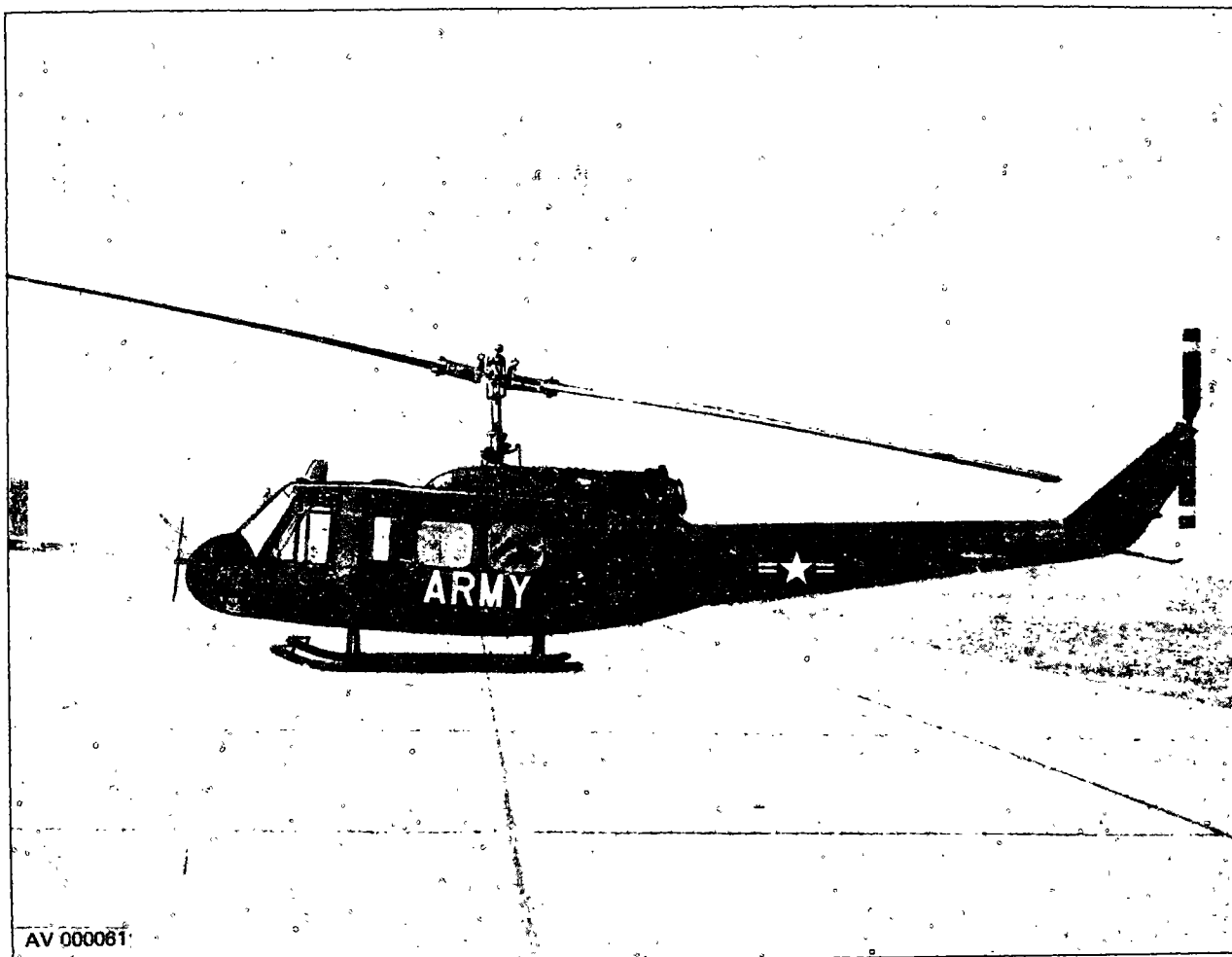
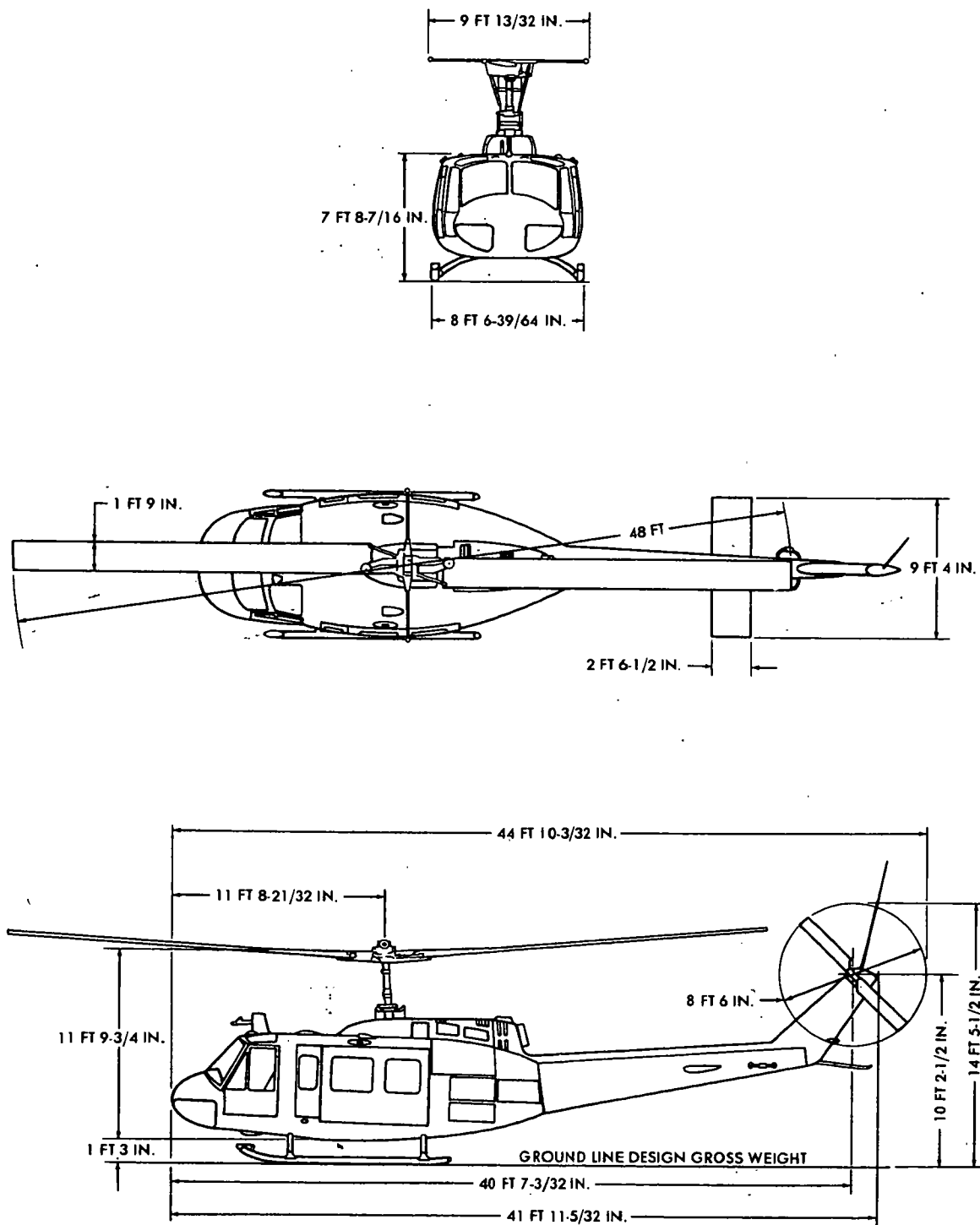


Figure 1-18. UH-1D and H (Iroquois)



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Figure 1-19. Principal dimensions, UH-1D and H (Iroquois)

1-37. UH-1D (Iroquois) Characteristics.

[illegible]

1-38. Loading and Performance — Typical Missions, UH-1D (Iroquois).

CONDITIONS	BASIC (PERSONNEL CARRIER)	TRANSPORT (CARGO OR TROOP)	LITTER EVACUATION	FERRY
TAKEOFF WEIGHT				
Fuel at 6.5 lb/gal (grade JP-4)	(lb) ... 7334 ^{6/}	8954 ^{6/}	6930 ^{5/}	8795 ^{5/}
Payload (outbound)	(lb) ... 1359	1359	1359	3309 ^{7/}
Payload (inbound)	(lb) ... 800	2420	0	0
Takeoff power loading ^{8/}	(lb/SHP) ... 0	0	1500 ^{9/}	0
Disk loading	(lb/sq ft) ... 6.66	8.14	6.30	7.99
Autorotation speed (min R/D)	(kn) ... 4.05	4.95	3.83	4.86
Takeoff ground run at SL (6600 rpm) ^{1/}	(ft) ... 51.7	55.5	50.9	55.1
Takeoff to clear 50 ft (6600 rpm) ^{1/}	(ft) ... 0	0	0	0
Vertical rate of climb at SL (6600 rpm) ^{1/}	(fpm) ... 0	0	0	0
Maximum rate of climb at SL ^{2/}	(fpm) ... 1620	420	1960	580
Speed for max R/C at SL	(kn) ... 1730	1220	1880	1260
Time: SL to 5000 ft ^{2/}	(min) ... 51.7	55.5	50.9	55.1
Time: SL to 10,000 ft ^{2/}	(min) ... 2.9	4.1	2.6	4
Service ceiling (100 fpm) ^{2/}	(ft) ... 6.2	9.8	5.6	9.3
Absolute hovering ceiling (6600 rpm) ^{1/}	(ft) ... 20,900	14,900	22,400	15,200
COMBAT RANGE ^{10/}	(nmi) ... 10,100	2300	12,200	3000
Average cruise speed	(kn) ... 305.4	259	....	705.0
Cruising altitude (initial)	(ft) ... 102	99	....	103
Cruising altitude (final)	(ft) ... 2000-4000	2000-4000	....	2000-4000
Total mission time	(hr) ... 2000-4000	2000-4000	....	2000-4000
COMBAT RADIUS ^{10/}	(nmi) ... 2.99	2.62	....	6.87
Average cruise speed	(kn) ... 149	134	143.3	....
Cruising altitude (outbound) (min/max)	(ft) ... 105.4	103.5	103.5	....
Cruising altitude (inbound)	(ft) ... 2000-4000	2000-4000	2000-4000	....
Total mission time	(hr) ... 2000-4000	2000-4000	2000-4000	....
FIRST LANDING WEIGHT ^{3/}	(lb) ... 2.92	2.7	2.34	....
Ground roll at SL (6600 rpm)	(ft) ... 6655	8220	6320	....
Total from 50 ft (6600 rpm)	(ft) ... 0	0	0	....
COMBAT WEIGHT ^{3/}	(lb) ... 0	0	0	....
Combat altitude	(ft) ... 5855	5800	7800	5753
Combat speed ^{4/}	(kn) ... 2000-4000	2000-4000	2000-4000	2000-4000
Combat climb ^{2/}	(fpm) ... 110	110	118	110
Combat ceiling (500 ft/min) ^{2/}	(ft) ... 2020	2040	1520	2070
Service ceiling (100 ft/min) ^{2/}	(ft) ... 25,000	25,200	16,200	25,400
Absolute hovering ceiling (6600 rpm) ^{1/}	(ft) ... 26,900	27,000	18,900	27,200
Takeoff ground run at SL (6600 rpm) ^{1/}	(ft) ... 17,600	17,800	7600	18,100
		0	0	0

1-38. Loading and Performance — Typical Missions, UH-1D (Iroquois) (CONT).

CONDITIONS	BASIC (PERSONNEL CARRIER)	TRANSPORT (CARGO OR TROOP)	LITTER EVACUATION	FERRY
Takeoff to clear 50 ft (6600 rpm) ^{1/} (ft) ...	0	0	0	0
Maximum rate of climb at SL ^{2/} (fpm) ...	2360	2400	1560	2420
Speed for max R/C at SL (kn) ...	48.8	48.7	52.8	48.6
Max speed at SL ^{4/} (kn) ...	120	120	117.5	120
Basic speed at 5000 ft ^{4/} (kn) ...	119	119	118	119
LANDING WEIGHT ^{3/} (lb) ...	5247	5247	7143	5753
Ground roll at SL (6600 rpm) (ft) ...	0	0	0	0
Total from 50 ft (6600 rpm) (ft) ...	0	0	0	0

^{1/} Takeoff power.

^{2/} Normal rated power.

^{3/} For RADIUS mission if radius is shown.

^{4/} V_{ne} limit.

^{5/} Includes crew of 2 at 400 lb.

^{6/} Includes crew of 1 at 200 lb.

^{7/} Includes two 150-gallon ferry tanks.

^{8/} Based on engine specification takeoff shaft horsepower.

^{9/} Six 250-pound litter patients.

^{10/} Detailed descriptions of RADIUS and RANGE missions are given in paragraph 1-53.

Performance Basis:

- Power required based on Bell Model 204B FAA Flight Test.
- Power available and fuel flow based on Lycoming Model Specification No. 104.28.
- All data are at 6400 rpm unless otherwise noted.

1-39. Performance Notes, UH-1D (Iroquois).

FORMULA: RADIUS MISSION I

Warm up, take off, climb on course to 2000-4000 feet initial altitude at normal rated power, proceed at long range cruise speed to remote base, land, and unload passengers. Without refueling, warm up, take off, climb on course to 2000-4000 feet at normal rated power, and return at long range cruise speed. Range-free allowances are 4 minutes at normal rated power for warmups and takeoffs plus 10 percent of initial fuel for reserve.

FORMULA: RADIUS MISSION II

Warm up, take off, and climb on course to 2000-4000 feet at normal rated power. Cruise climb on course at long range cruise speed to final altitude of 2000-4000 feet. Proceed at long range speed to remote base, land, and unload cargo or troops. Without refueling, warm up, take off, climb on course to 2000-4000 feet at normal rated power, and return at long range cruise speed. Range-free allowances are 4 minutes at normal rated power for warmups and takeoffs plus 10 percent of initial fuel for reserve.

FORMULA: RADIUS MISSION III

Warm up, take off, and climb on course to 2000-4000 feet at normal rated power. Proceed at long range cruise speed to remote base, land, and pick up litter patients. Without refueling, warm up, take off,

climb on course to 2000-4000 feet at normal rated power, and return at long range cruise speed. Range-free allowances are 4 minutes at normal rated power for warmups and takeoffs plus 10 percent of initial fuel for reserve.

FORMULA: RANGE MISSION I

Warm up, take off, and climb on course to 2000-4000 feet initial altitude at normal rated power. Proceed at long range cruise speed to remote base and land. Range-free allowances are 2 minutes at normal rated power for warmup and takeoff plus 10 percent of initial fuel for reserve.

FORMULA: RANGE MISSION II

Warm up, take off, and climb on course to 2000-4000 feet at normal rated power. Cruise climb on course at long range cruise speed to final altitude of 2000-4000 feet. Proceed at long range cruise speed to remote base and land. Range-free allowances are 2 minutes at normal rated power for warmup and takeoff plus 10 percent of initial fuel for reserve.

FORMULA: RANGE MISSION IV

Warm up, take off, and climb on course to 2000-4000 feet at normal power. Cruise climb on course at long range cruise speed to final altitude of 2000-4000 feet. Proceed at long range cruise speed to remote base and land. Range-free allowances are 2 minutes at normal rated power for warmup and takeoff plus 10 percent of initial fuel for reserve.

POWERPLANT		MISSION AND DESCRIPTION		WEIGHTS	
No. & model	(1) T53-L-13/ -13A/-13B	Mfr's Model: Bell 205 The UH-1H is a modified UH-1D with the T53-L-13 turbine engine. The basic description and mission are the same for both aircraft. The advantages over the UH-1D are takeoff distance, rate of climb, range, endurance, and overall mission capabilities. All future production of the UH-1D will be the UH-1H model. Some UH-1H's have complete provisions for a variable speed, power-driven hoist supported by a swing boom, capable of lifting personnel or up to 600 pounds of cargo while hovering. Production and retrofit of a crashworthy fuel system with closed circuit refueling capability is being accomplished on the UH-1D/H aircraft.		Empty	LB L.F.
Mfr	Lycoming			5132	
Type	104.33			Design	6600 3.0
Red. gear ratio . .	0.312			Combat	9500 2.2
Tailpipe	Fixed area			Max takeoff	9500 2.2
Augmentation . .	None			Max landing	9500
ENGINE RATINGS					
T53-L-13				FUEL AND OIL	
Rating/SL	SHP	SFC	Output RPM	Fuel:	
Mil	1400*	0.580	6300	Grade	JP-4/5
NRP	1250*	0.598	6040	Spec	MIL-T-5624
* 1400 SHP flat rated to 1100 SHP.				No. tanks:	
DIMENSIONS		CAPACITIES	PERSONNEL	Fuselage	(2) 209 gal
		Inside clearance	Basic mission	Ferry	(1) 300 gal
		Cargo area:	Crew	Total qty	509 gal
		Length (overall) . .	Passengers	Oil:	
		Width (floor level)		Spec	MIL-L-23699
		Height (max)			or
		Copilot area:			MIL-L-7808
		Length (overall) . .		No. tanks	1
		Width		Location	Fuselage
		Height (max)		Qty	4-1/2 gal
		Main cargo door			
		Height (max)		AVIONICS	
		Width (max)			
		Height above ground		Refer to chapter 2.	
		Limit floor loads		ARMAMENT	
		Cargo area			
		Copilot area		Refer to chapter 2.	
		Usable cubage			
		Capacity:			
		Cargo area			
		Copilot area			

1-41. Loading and Performance-Typical Missions, UH-1H (Iroquois).

CONDITIONS	BASIC (PERSONNEL CARRIER)	TRANSPORT (CARGO OR TROOP)	LITTER EVACUATION	FERRY
TAKEOFF WEIGHT (lb)	7644 <u>6/</u>	9264 <u>6/</u>	7414 <u>5/</u>	9305 <u>5/</u>
Fuel at 6.5 lb/gal (grade JP-4) (lb)	1370	1370	1370	3320 <u>7/</u>
Payload (outbound) (lb)	800	2420	0	0
Payload (inbound) (lb)	0	0	1500 <u>9/</u>	0
Takeoff power loading <u>8/</u> (lb/SHP)	6.94	8.42	6.74	8.45
Disk loading (lb/sq ft)	4.22	5.11	4.10	5.14
Autorotation speed (min R/D) (kn)	61	65	60	65
Takeoff ground run at SL (6600 rpm) <u>1/</u> (ft)	0	0	0	0
Takeoff to clear 50 ft (6600 rpm) <u>1/</u> (ft)	0	0	0	0
Vertical rate of climb at SL (6600 rpm) <u>1/</u> (fpm)	1620	420	1960	580
Maximum rate of climb at SL <u>2/</u> (fpm)	1653	1126	1691	1112
Speed for max R/C at SL (kn)	61	65	60	65
Time: SL to 5000 ft <u>2/</u> (min)	3.1	4.6	2.9	4.1
Time: SL to 10,000 ft <u>2/</u> (min)	6.2	9.9	5.9	10.2
Service ceiling (100 fpm) <u>2/</u> (ft)	18,340	13,960	19,140	13,640
Absolute hovering ceiling (6600 rpm) <u>1/</u> (ft)	14,800	4000	16,000	3600
COMBAT RANGE <u>10/</u> (nmi)	275	250	....	676
Average cruise speed (kn)	111	105	....	110
Cruising altitude (initial) (ft)	2000-4000	2000-4000	....	2000-4000
Cruising altitude (final) (ft)	2000-4000	2000-4000	....	2000-4000
Total mission time (hr)	2.46	2.37	....	6.13
COMBAT RADIUS <u>10/</u> (nmi)	141	124	133	....
Average cruise speed (kn)	111	107	121	....

1-41. Loading and Performance – Typical Missions, UH-1H (Iroquois) (CONT).

CONDITIONS	BASIC (PERSONNEL CARRIER)	TRANSPORT (CARGO OR TROOP)	LITTER EVACUATION	FERRY
Cruising altitude (outbound) (min/max) (ft)	2000-4000	2000-4000	2000-4000	.....
Cruising altitude (inbound) (ft)	2000-4000	2000-4000	2000-4000	.....
Total mission time (hr)	2.73	2.54	2.38	.....
FIRST LANDING WEIGHT ^{3/} (lb)	6997	8584	6789	.....
Ground roll at SL (6600 rpm) (ft)	0	0	0	.....
Total from 50 ft (6600 rpm) (ft)	0	0	0	.....
COMBAT WEIGHT ^{3/} (lb)	6197	6164	8289	6316
Combat altitude (ft)	2000-4000	2000-4000	2000-4000	2000-4000
Combat speed ^{4/} (kn)	116	116	120	116
Combat climb ^{2/} (fpm)	2256	2276	1370	2200
Combat ceiling (500 ft/min) ^{2/} (ft)	23,550	23,694	15,960	23,150
Service ceiling (100 ft/min) ^{2/} (ft)	24,070	24,210	16,842	23,680
Absolute hovering ceiling (6600 rpm) ^{1/} (ft)	21,300	21,400	11,600	20,700
Takeoff ground run at SL (6600 rpm) ^{1/} (ft)	0	0	0	0
Takeoff to clear 50 ft (6600 rpm) ^{1/} (ft)	0	0	0	0
Maximum rate of climb at SL ^{2/} (fpm)	2232	2251	1399	2178
Speed for max R/C at SL (kn)	55.9	55.8	62.0	56.1
Max speed at SL ^{4/} (kn)	120	120	120	120
Basic speed at 5000 ft ^{4/} (kn)	120	120	120	120
LANDING WEIGHT ^{3/} (lb)	6977	8584	6789	6316
Ground roll at SL (6600 rpm) (ft)	0	0	0	0
Total from 50 ft (6600 rpm) (ft)	0	0	0	0

1-41. Loading and Performance – Typical Missions, UH-1H (Iroquois) (CONT).

- 1/ Takeoff power.
- 2/ Normal rated power.
- 3/ For RADIUS mission if radius is shown.
- 4/ V_{ne} limit.
- 5/ Includes crew of 2 at 400 lb.
- 6/ Includes crew of 1 at 200 lb.
- 7/ Includes two 150-gallon ferry tanks.
- 8/ Based on engine specification takeoff shaft horsepower.
- 9/ Six 250-pound litter patients.
- 10/ Detailed descriptions of RADIUS and RANGE missions are given in paragraph 1-52.

Performance Basis:

- a. Reference operator's Manual Army Model UH-1D H Helicopter TM 55-1520-210-10.
- b. All data are at 6600 rpm unless otherwise noted.

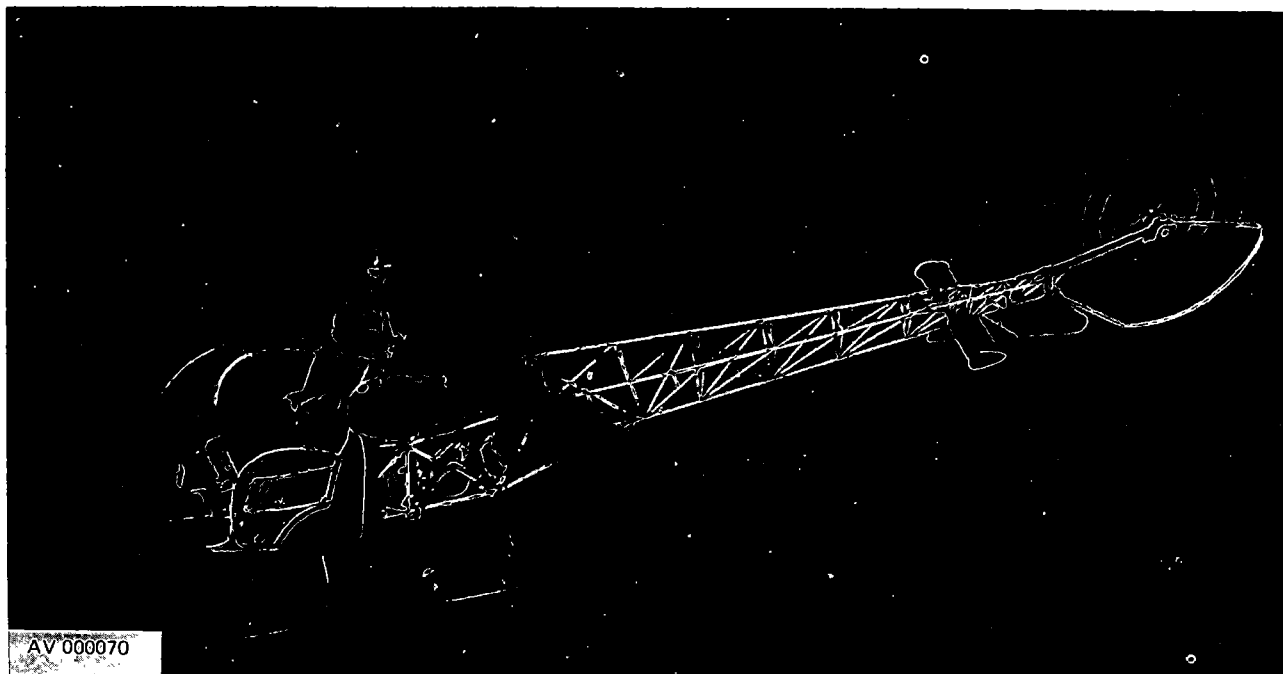
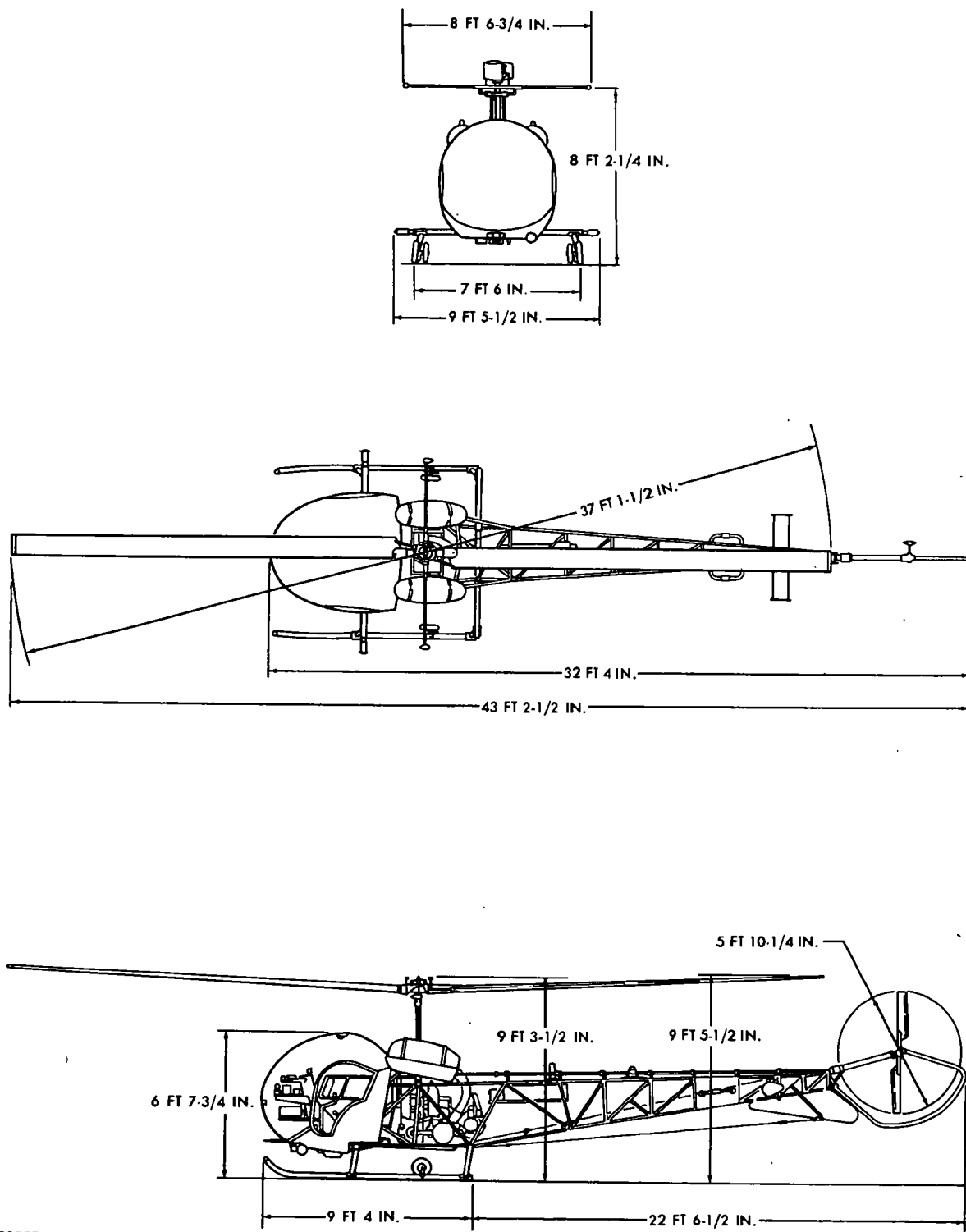


Figure 1-20. TH-13T (Sioux)



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Figure 1-21. Principal dimensions, TH-13T (Sioux)

1-42. TH-13T (Sioux) Characteristics.

POWERPLANT	MISSION AND DESCRIPTION		WEIGHTS	
No. & model ... (1) O-435-25A Mfr Lycoming Engine spec No . 2354 Red. gear ratio . D.D.	Mfr's Model: Bell 47G3-B1 The principal mission of the TH-13T is primary instrument training. The TH-13T incorporates a 2-blade main rotor and a 2-blade tail rotor with a hydraulically boosted cyclic and collective control system. The fuselage is an open-tube configuration with a bubble-type cockpit enclosure. The landing gear is of the skid-type, with ground handling wheels attached. Dual controls are installed.		LB L.F. Empty (actual) ... 2060 Design 2950 2.5	
ENGINE RATINGS	DEVELOPMENT		FUEL AND OIL	
BHP RPM ALT MIN Takeoff 270 3200 SL 5 Normal 220 3200 SL Cont.			Fuel: Grade 115/145 Spec MIL-G-5572 No. tanks 2 Location Fuselage Qty 57 gal Oil: Spec Temps above +30°F MIL-L-22851 Type II Temps below +30°F MIL-L-22851 Type III No. tanks 1 Location Engine section Qty 3-1/2 gal	
DIMENSIONS	Contract awarded June 1964 First acft delivered December 1964 Last production acft December 1968		AVIONICS	
Rotor dia 37 ft, 1-1/2 in. Length: Rotors operating 43 ft, 2-1/2 in. Rotors static ... 43 ft, 2-1/2 in. Fuselage 32 ft, 4 in. Span (max lateral) 8 ft, 6-3/4 in. Height 9 ft, 3-1/2 in. Tread 7 ft, 6 in. Rotor gnd clearance (static) 8 ft, 8-1/2 in. (idling) 8 ft, 8-1/2 in.			Refer to chapter 2.	
	FEATURES	PERSONNEL	ARMAMENT	
	Dual controls.	Crew (normal) 1 Passenger/student 1	None.	

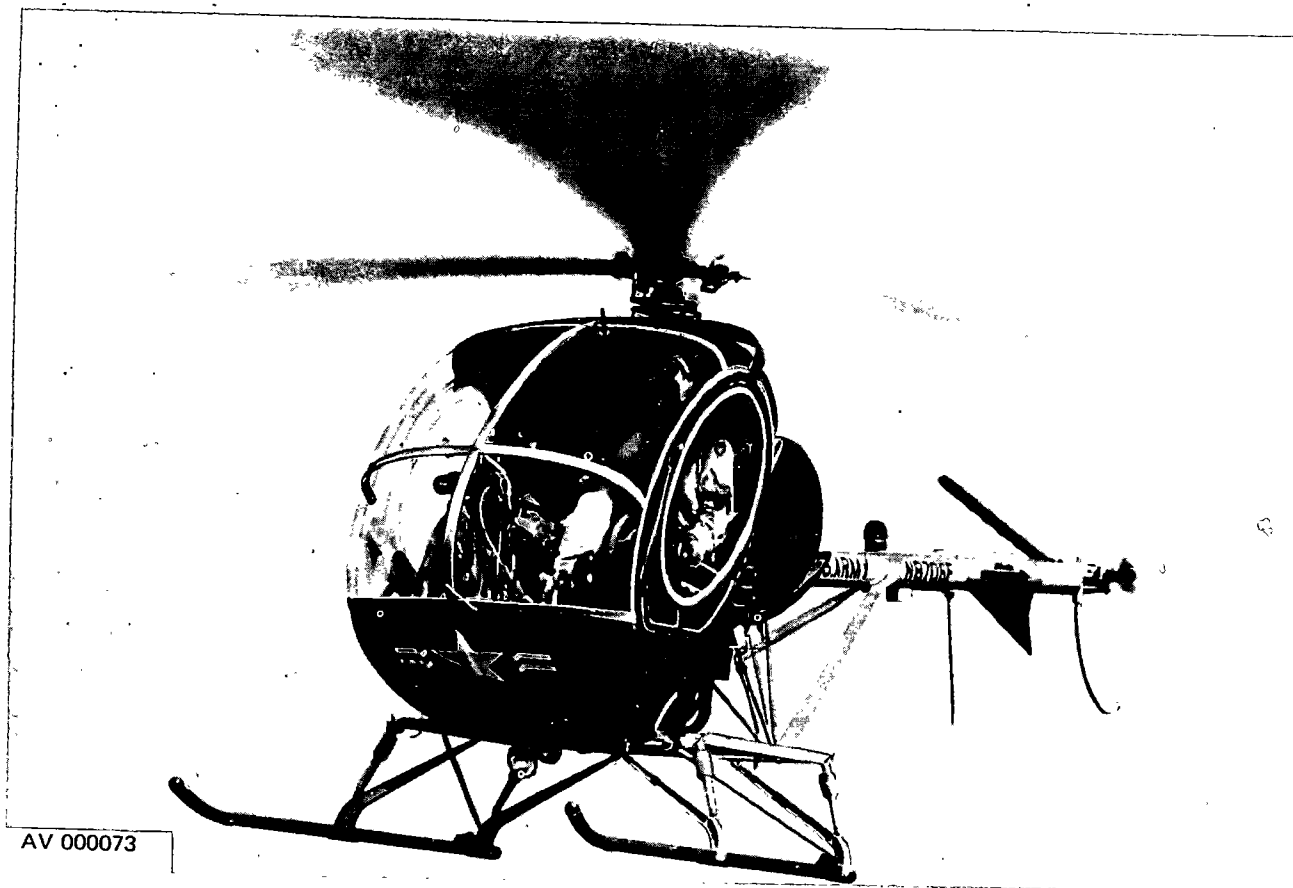


Figure 1-22. TH-55A (Osage)

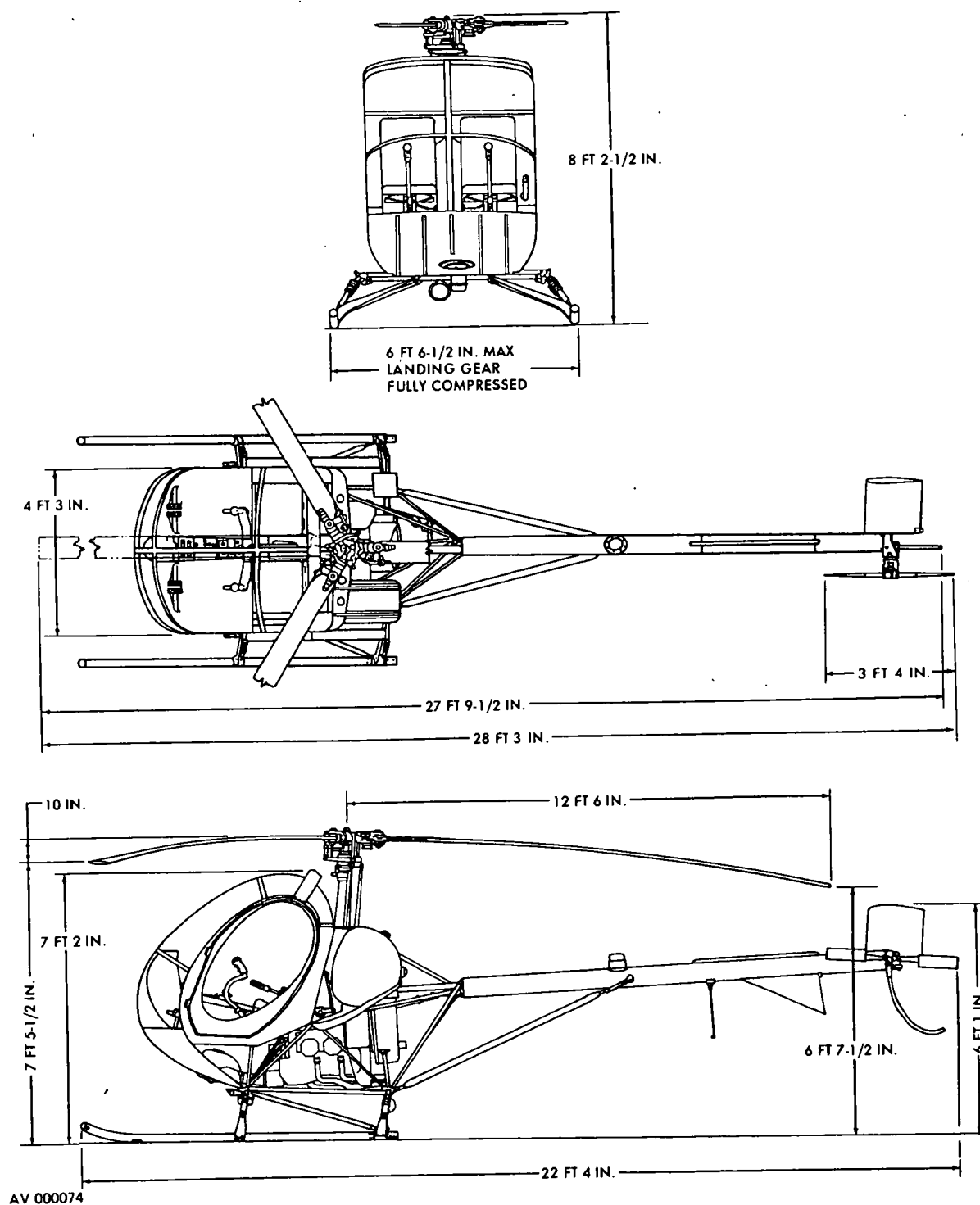


Figure 1-23. Principal dimensions, TH-55A (Osage)

1-43. TH-55A (Osage) Characteristics.

POWERPLANT				MISSION AND DESCRIPTION		WEIGHTS	
No. & model .. (1) H10-360-B1A Mfr Lycoming Engine spec. No. 2313-b Engine to main rotor rear ratio 6:1				The TH-55A helicopter is manufactured by the Hughes Tool Company, Aircraft Division, Culver City, California. The mission of the TH-55A is the training of military pilots in the basic operation and performance of a helicopter. Training will be accomplished only in CONUS and from an established aviation training base. The two-place cabin is designed to accommodate an instructor and student with the seating arrangement side by side. The instructor and student each have a complete set of flight controls.		LB	
						Empty 1008.1 Useful load 591.9 Design (gross) 1600 Combat NA Max takeoff 1600	
ENGINE RATINGS						FUEL AND OIL	
	BHP	RPM	MIN			Fuel:	
Takeoff	180	2900	5	Grade 115/145		Spec MIL-G-5572	
Normal	160	2700-2900	Cont.	PERSONNEL		No. of tanks 1	
max power						Location Left rear of cabin	
DIMENSIONS						Qty 25 gal	
Main rotor dia. . 27 ft, 5 in. Number of blades 3 Blade twist 8-deg washout Airfoil section.. NACA 0015 Length: Rotors operating ... 28 ft, 3 in. Rotors static.. 22 ft, 4 in. Fuselage..... 21 ft, 10-3/4 in. Height 8 ft, 2-1/2 in. Tread (static) . . 6 ft, 3 in.(approx) Main rotor gnd clearance: Operating 8 ft, 3-1/2 in. Static. 7 ft, 5-1/2 in. Tail rotor gnd clearance 3 ft, 2-1/2 in. Tail rotor: Number of blades 2 Delta 3 angle . 30 deg Rotor dia. 3 ft, 4 in. Airfoil section NACA 0015 Horizontal stabilizer: Span (from boom centerline) . . 2 ft, 5 in. Airfoil section.. NACA 0015						Oil: Spec Temps above +60°F MIL-L-22851 Type II Temps below +60°F MIL-L-22851 Type III No. tanks 1 Qty 2 gal	
				DEVELOPMENT				AVIONICS
				Contract awarded June 1964 First acft delivered November 1964 Last production acft April 1969		Refer to chapter 2.	
						ARMAMENT	
						None.	

44. Loading and Performance — Typical Mission, TH-55A (Osage).

CONDITIONS	BASIC MISSION
Fuel at 6.0 lb/gal (grade 115/145) (lb) . . .	150
Payload (lb) . . .	591.9
Cruise speed at SL (kn) . . .	75
Rate of climb at SL (ft/min) . . .	1400
Endurance (2700 rpm)	2-1/2 hrs at 65 knots cruise speed (min)
Hover ceiling, out of ground effect, 110°F (ft) . . .	1000 (min)
Normal autorotation speed (kn) . . .	45
Normal autorotation rotor speed (rpm) . . .	480
Autorotation rate of descent at 1000 ft, 100°F, 480 rpm and 45 knots (ft/min) . . .	1900 (max)
Altitude necessary to regain normal autorotation rotor speed from lower red line (ft) . . .	200 (max)
Range (normal) (nmi) . . .	200
Service ceiling (ft) . . .	11,000

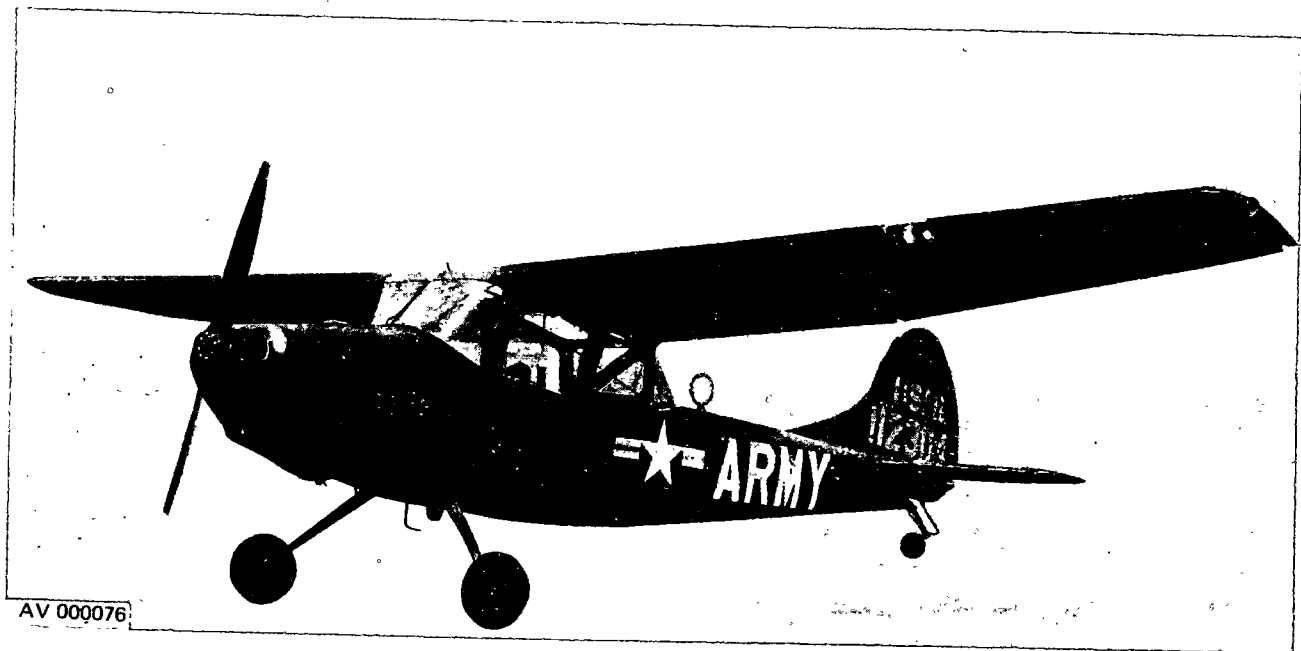
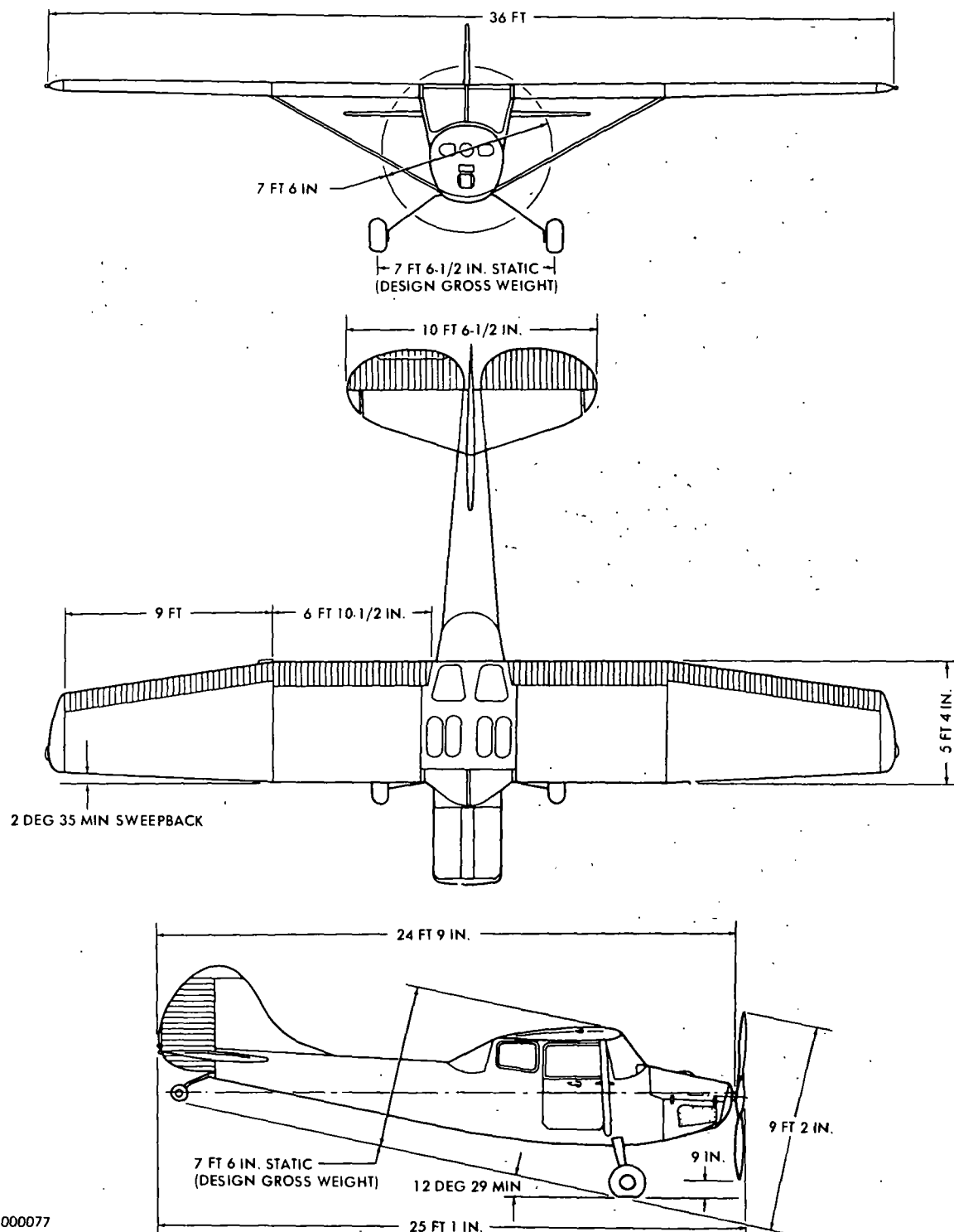


Figure 1-24. O-1G (Bird Dog) Typical



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Figure 1-25. Principal dimensions, O-1G (Bird Dog)

POWERPLANT

[illegible]

1-46. Loading and Performance — Typical, O-1G (Bird Dog).

CONDITIONS	BASIC MISSION	DESIGN MISSION	ALTERNATE WEIGHT RANGE	FERRY RANGE
TAKEOFF WEIGHT (lb) ...	2291 ^{5/}	2165 ^{5/}	2400 ^{5/}	2089 ^{6/}
Fuel at 6.0 lb/gal (grade 115/145) (lb) ...	246	123	246	246
Payload (lb) ...	None	None	100	None
Wing loading (lb/sq ft) ...	13.2	12.4	13.8	12.0
Stall speed (power off) (kn) ...	47	46	48	45
Takeoff ground run at SL ^{1/} (ft) ...	350	310	390	285
Takeoff to clear 50 ft ^{1/} (ft) ...	630	560	675	525
Rate of climb at SL ^{2/} (fpm) ...	1115	1225	1035	1295
Time: SL to 10,000 ft ^{2/} (min) ...	12.4	11.0	14.2	10.3
Time: SL to 20,000 ft ^{2/} (min) ...	44.0 ^{2/}	39.7	44.0 ^{2/}	35.5
Service ceiling (100 fpm) ^{2/} (ft) ...	19,500	20,600	18,600	21,300
COMBAT RANGE ^{3/} (nmi) ...	455	196	449	454
Average cruising speed (kn) ...	86	86	86	86
Cruising altitude (ft) ...	5000	5000	5000	5000
Total mission time (hr) ...	5.3	2.3	5.3	5.3
COMBAT RADIUS ^{3/} (nmi) ...	209	83	....	....
Average cruising speed (kn) ...	86	86	....	....
Cruising altitude (ft) ...	5000	5000	....	....
Total mission time (hr) ...	4.9	2.0	....	....
FIRST LANDING WEIGHT ^{4/} (lb) ...	2180	2113	....	....
Ground roll at SL (ft) ...	290	280	....	....
Total from 50 ft (ft) ...	570	560	....	....
COMBAT WEIGHT ^{4/} (lb) ...	2180	2113	2179	1868
Combat altitude (ft) ...	5000	5000	5000	5000
Combat speed ^{2/} (kn) ...	101	101	101	101
Combat climb ^{2/} (fpm) ...	945	1000	945	1245
Combat ceiling (500 fpm) ^{2/} (ft) ...	13,000	13,700	13,000	16,600
Service ceiling (100 fpm) ^{2/} (ft) ...	20,400	21,000	20,400	23,400
Takeoff ground run at SL ^{1/} (ft) ...	310	290	....	....
Takeoff to clear 50 ft ^{1/} (ft) ...	565	535	....	....
Rate of climb at SL ^{2/} (fpm) ...	1210	1270	1210	1535

1-46. Loading and Performance – Typical, O-1G (Bird Dog) (CONT).

CONDITIONS	BASIC MISSION	DESIGN MISSION	ALTERNATE WEIGHT RANGE	FERRY RANGE
Max speed at SL ^{2/} (kn) ...	101	101	101	101
Basic speed at 5000 ft ^{2/} (kn) ...	101	101	101	101
LANDING WEIGHT ^{4/} (lb) ...	2070	2061	2179	1868
Ground roll at SL (ft) ...	275	275	290	250
Total from 50 ft (ft) ...	555	555	570	530

^{1/} Takeoff power.^{2/} Normal power.^{3/} Detailed descriptions of RADIUS and RANGE missions are given in paragraph 1-67.^{4/} For RADIUS mission if radius is shown.^{5/} Includes crew of 2 at 400 lb.^{6/} Includes crew of 1 at 200 lb.^{7/} Time to service ceiling.

Performance Basis:

- a. Data source: Flight test of O-1E.
- b. Performance is based on powers shown.

POWERPLANT		MISSION AND DESCRIPTION		WEIGHTS	
No. & model (1) O-470-11A or -11B Mfr Continental Engine spec No . . . 1276e Red. gear ratio . . . D.D. Prop mfr McCauley Prop model No . . . 1A200FM9047 Prop type Fixed pitch No. blades 2 Prop dia 7 ft. 6 in.		Mfr's Model: Cessna 305A (Modified) The principal missions of the O-1G are reconnaissance and observation. The O-1G is a dual-controlled, all-metal, high-wing aircraft of semimonocoque construction. High-lift, slotted, electrically operated wing flaps are provided. The landing gear consists of two spring steel leaves. Tailwheel steering is made possible by spring-loaded cables attached to the rudder control system. Provisions are made for tandem landing gear and skis or flotation gear. The pilot's seat is adjustable fore-and-aft on racks. The observer's seat is removable to accept more cargo and is provided with a socket installation so the seat back can be changed to allow the observer to face fore-or-aft. Ambulance or cargo conversions are made by removing the rear seat back and installing the Gran portable stretcher or cargo as desired. The normal crew consists of pilot and observer. Litter patient or passenger may be carried in lieu of the observer.		LB L.F. Empty (calculated) 1716 Basic (calculated) . 1721 Design 2400 4.4 Combat *2180 Max takeoff (alt) . +2800 +3.5 Max inflight 2800 3.8 Max landing 2800 3.5 Limit maneuvering load factors (2800) 3.8 & -1.52. Limit gust load factors (2800) 3.22 & -1.22. *For basic mission. +Limited by strength. *Wing flaps retracted. *Wing flaps extended.	
ENGINE RATINGS					
	BHP RPM ALT MIN				
Takeoff	213 2600 SL 5				
Normal	100 2300 SL Cont.				
DIMENSIONS		DEVELOPMENT		FUEL AND OIL	
Wing Span 36 ft Incidence (root) . . 1 deg, 30 min Incidence (tip) . . . 1 deg, 30 min Dihedral 2 deg, 8 min Sweepback (LE) . . 2 deg, 35 min Length 25 ft, 9-1/2 in. Height 9 ft, 2 in. Tread 7 ft, 6-1/2 in. Prop gnd clearance 9 in.		Design initiated May 1967 First flight (basic prototype) March 1969 First acceptance March 1969 Production completed November 1970		Fuel: Grade 115/145 Spec MIL-G-5572 No. tanks 2 Location Wings, inbd Qty 41 gal Oil: Spec Temps above +30°F MIL-L-22851 Type II Temps below +30°F MIL-L-22851 Type III No. tanks 1 Location Engine sump Qty 2-1/2 gal	
		CAPACITIES	FEATURES		
		**Baggage compartment Length 1 ft, 11 in. Height 2 ft, 5 in. Width 2 ft *Cargo compartment (rear seat removed) Length 4 ft, 11 in. Height 2 ft, 5 in. Width 2 ft, 2 in.	Single-slotted flaps. Skis and floats (prov). Tandem landing gear kit (prov). Dual controls. Self-sealing fuel tanks. Castoring landing gear axle Assy.		
			AVIONICS		
		*Includes baggage compartment.	Refer to chapter 2.	ARMAMENT	
		**Depending on the radio configuration		8/Rocket firing capabilities.	

1-48. Loading and Performance — Typical, O-1G (Bird Dog) (2800 lbs.)*.

CONDITIONS	BASIC MISSION	DESIGN MISSION	ALTERNATE WEIGHT RANGE	FERRY RANGE
TAKEOFF WEIGHT .....(lb)	2291 <u>5/</u>	2165 <u>5/</u>	2800 <u>5/</u>	2292 <u>6/</u>
Fuel at 6.0 lb/gal (grade 115/145) .....(lb)	246	123	246	246
Payload .....(lb)	None	None	100	None
Wing loading .....(lb/sq ft)	13.2	12.4	13.8	12.0
Stall speed (power off) (60° Flaps) (kn)	47	46	59.5	54.8
Takeoff ground run at SL <u>1/</u> (30° Flaps) (ft)	350	310	960	285
Takeoff to clear 50 ft <u>1/</u> (30° Flaps) (ft)	630	560	1720	525
Rate of climb at SL <u>2/</u> (fpm)	1115	1225	1000	1295
Time: SL to 10,000 ft <u>2/</u> (min)	12.4	11.0	20.0	10.3
Time: SL to 16,800 ft <u>2/</u> (min)	44.0 <u>7/</u>	39.7	54.0 <u>7/</u>	35.5
Service ceiling (100 fpm) <u>2/</u> (ft)	19,500	20,600	16,800	21,300
COMBAT RANGE <u>3/</u> (nmi)	455	196	441	454
Average cruising speed (kn)	86	86	91	86
Cruising altitude (ft)	5000	5000	5000	5000
Total mission time (hr)	5.3	2.3	4.75	5.3
COMBAT RADIUS <u>3/</u> (nmi)	209	83	....	....
Average cruising speed (kn)	86	86	91	91
Cruising altitude (ft)	5000	5000	5000	5000
Total mission time (hr)	4.9	2.0	4.75	....
FIRST LANDING WEIGHT <u>4/</u> (lb)	2180	2113	....	....
Ground roll at SL (ft)	290	280	....	....
Total from 50 ft (ft)	570	560	....	....
COMBAT WEIGHT <u>4/</u> (lb)	2180	2113	2179	2292
Combat altitude (ft)	5000	5000	5000	5000
Combat speed <u>2/</u> (kn)	101	101	98	98
Combat climb <u>2/</u> (fpm)	945	1000	1000	1245
Combat ceiling (500 fpm) <u>2/</u> (ft)	13,000	13,700	5700	16,600
Service ceiling (100 fpm) <u>2/</u> (ft)	20,400	21,000	16,800	16,800
Takeoff ground run at SL <u>1/</u> (ft)	310	290	960	....
Takeoff to clear 50 ft <u>1/</u> (ft)	565	535	1720	....
Rate of climb at SL <u>2/</u> (fpm)	1210	1270	1000	1535

1-48. Loading and Performance – Typical, O-1G (Bird Dog) (2800 lbs.)* (CONT).

CONDITIONS	BASIC MISSION	DESIGN MISSION	ALTERNATE WEIGHT RANGE	FERRY RANGE
Max speed at SL <u>2</u> /..... (kn)	101	101	98	101
Basic speed at 5000 ft <u>2</u> /..... (kn)	101	101	98	101
LANDING WEIGHT <u>4</u> /..... (lb)	2070	2061	2554	1868
Ground roll at SL (60° Flaps)..... (ft)	275	275	338	250
Total from 50 ft (60° Flaps)..... (ft)	555	555	1070	530

1/Takeoff power.

2/Normal power.

3/Detailed descriptions of RADIUS and RANGE missions are given in paragraph 1-49.

4/For RADIUS mission if radius is shown.

5/Includes crew of 2 at 400 lb.

6/Includes crew of 1 at 200 lb.

7/Time to service ceiling.

8/A rocket firing armament system was installed in some O-1 aircraft. If the armament wiring is per Cessna drawing 0600522, rockets (2.75) may be fired utilizing rocket tubes P/N 10210137 or 10678601 and loads can be dropped. If armament wiring is per Cessna drawing 0600235, only loads can be dropped.

Performance Basis:

a. Data source: Flight test of O-1E.

b. Performance is based on powers shown.

*Modification of 2400 lb. category aircraft to 2800 lb. category makes the following changes: installs a stronger tail wheel spring; increases the rudder and elevator area; installs an elevator down spring; changes the angular travel of the elevator tab; and shifts the center of gravity limits to allow a more aft CG.

1-49. Performance Notes, O-1G (Bird Dog).

FORMULA: RADIUS MISSION I

Warm up, take off, climb on course to 5000 feet at normal power, cruise out at long range speeds to remote base, and land. Without refueling, warm up, take off, climb on course to 5000 feet at normal power, and return at long range speeds. Range-free allowances are 10 minutes of normal power for warm-ups and takeoffs, plus fuel for 20 minutes at speeds for long range at sea level, and 5 percent of initial fuel for reserve.

FORMULA: RADIUS MISSION II

Warm up, take off, climb on course to 5000 feet at normal power, cruise out to remote base at long range speeds, and return at long range speeds. Range-free allowances are 5 minutes of normal power for warmup and takeoff, plus fuel for 20 minutes at speeds for long range at sea level, and 5 percent of initial fuel for reserve.

FORMULA: RANGE MISSIONS I, II, & IV

Warm up, take off, climb on course to 5000 feet at normal power, and cruise out at long range speeds until all but reserve fuel is consumed. Range-free allowances are 5 minutes of normal power for warmup and takeoff, plus fuel for 20 minutes at sea level, and 5 percent of initial fuel for reserve.

FORMULA: RADIUS MISSION III

Warm up, take off, climb on course to 5000 feet at normal power, cruise out at long range speeds to remote area, and lay wire. Climb on course to 5000 feet at normal power and return at long range speeds. Range-free allowances are 5 minutes of normal power for warmup and takeoff, plus 10 minutes of normal power for wire laying, fuel for 20 minutes at speeds for long range at sea level, and 5 percent of initial fuel for reserve.

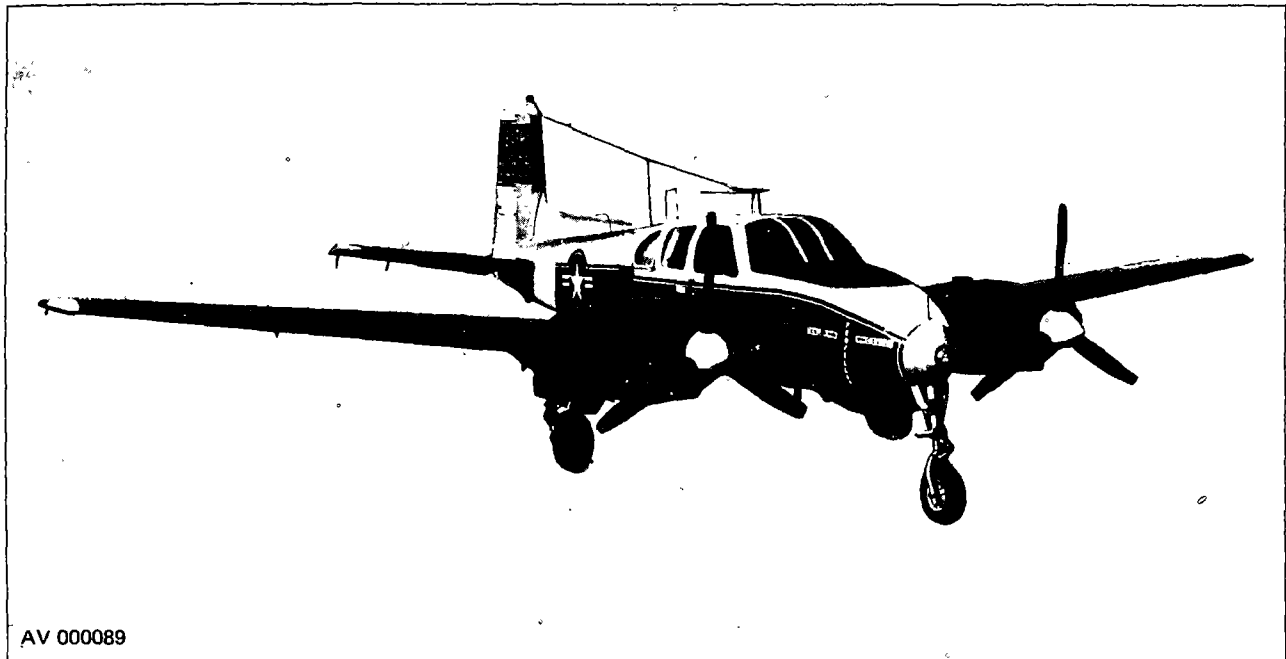


Figure 1-26. U-8D and G (Seminole), typical, (minor differences apparent between D and G models)

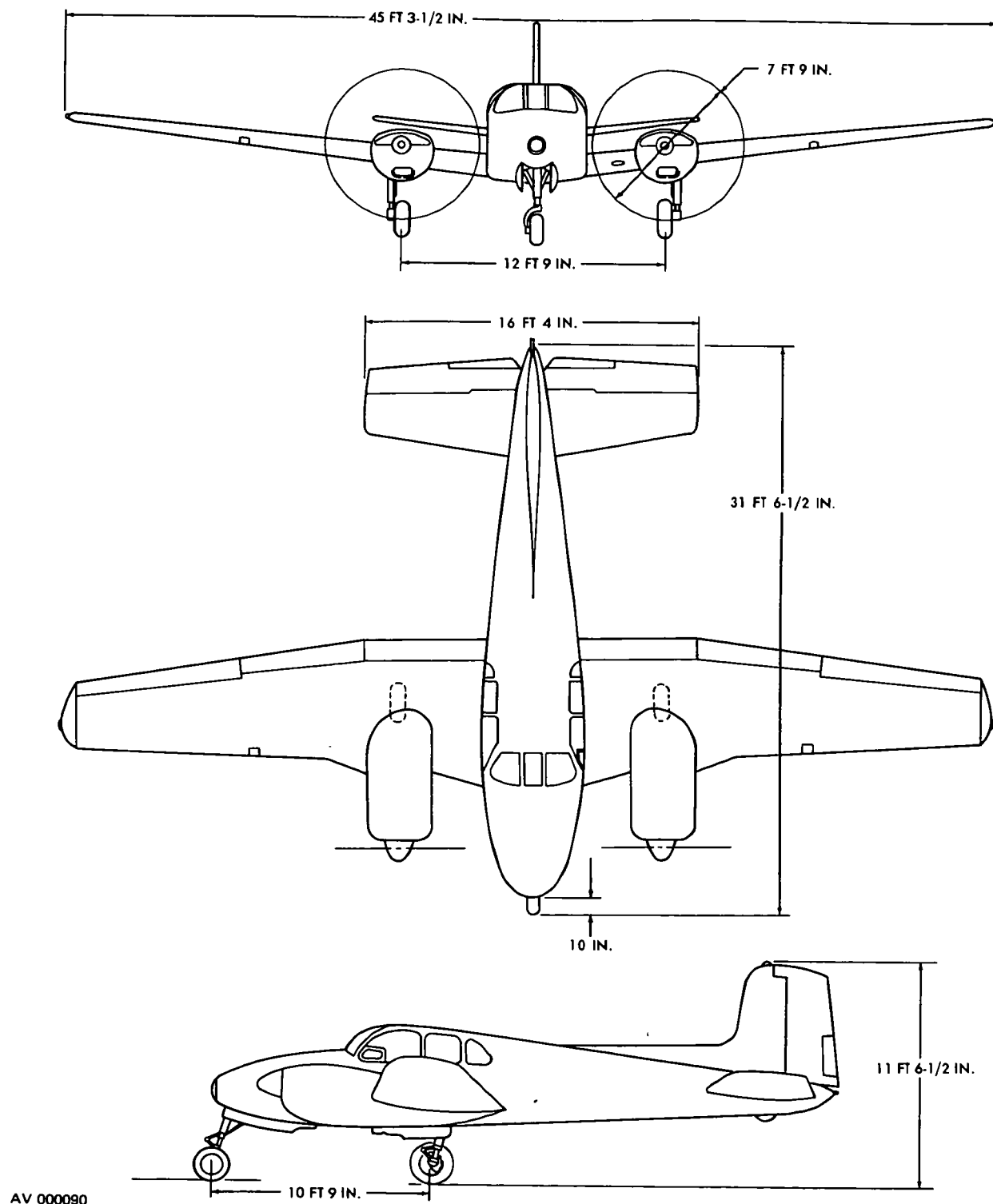


Figure 1-27. Principal dimensions, U-8D (Seminole)

1-50. U-8D/G* (Seminole) Characteristics.

POWERPLANT		MISSION AND DESCRIPTION	WEIGHTS	
No. & model	(2) 0-480-1A/-1B	Mfr's Model: Beech E-50	LB	L.F.
Mfr	Lycoming	The principal mission of the U-8D is the transportation of personnel.	Empty (calculated). . .	4944
Engine spec No . .	2202-B	The U-8D is a clean Cantilever, low-wing monoplane and can be quickly converted into a cargo carrier by removing the rear cabin seat and the right-hand front seat.	Basic (calculated) . . .	4978
Red. gear ratio . .	0.642	The cabin arrangement allows the front seat to accommodate three persons abreast, the pilot on the left, assist pilot or passenger in the center, and a passenger on the right, while the rear seat accommodates three additional passengers.	Design	7000 +4.4 -1.76
Prop mfr	Hartzell	Emergency evacuation is accomplished by jettisoning the cabin door and by opening the rear cabin windows.	Combat (basic mission).	5953
Blade design No . .	10151-B8	The leading edge, main spar, and rear section of the wings are joined by piano-type hinge loops and stainless steel rods.	Max takeoff (overload)	*7300
Prop type	Hydramatic, CC, FF	Warm air system is utilized for anti-icing of windshields.	Max takeoff (normal)	*7300
Prop dia	7 ft, 9 in.	The U-8D is similar to the U-8A and B, except it has three-blade metal propellers in lieu of two-blade metal propellers plus increased horsepower and gross weight. All U-8A and B aircraft have been modified to U-8D aircraft.	Max landing	**7000
No. blades	3		*Limited by strength.	
Superch	1 stg, centrif		**Limited by max takeoff weight.	
ENGINE RATINGS			FUEL AND OIL	
BHP	RPM		Fuel:	
Takeoff 340	3400		Grade	115/145
Normal 320	3200		Spec	MIL-G-5572
			No. tanks	8
			Location	Wing
			Qty	230 gal
DIMENSIONS		DEVELOPMENT	Oil:	
Wing:		First flight	Spec	
Span	45 ft, 3-1/2 in.	First acceptance	Temps above +60°F	MIL-L-22851
Incidence (root). .	5 deg, 48 min	Production completed	Type II	
Incidence (tip). .	1 deg	Formerly designated L-23D	Temps below +60°F	MIL-L-22851
Dihedral	7 deg		Type III	
Sweepback	0.0 deg		No. tanks	2
Length	31 ft, 6-1/2 in.		Qty	8 gal
Height	11 ft, 6-1/2 in.		AVIONICS	
Tread	12 ft, 9 in.		Refer to chapter 2.	
Prop gnd clearance	1 ft, 3 in.		ARMAMENT	
			None.	

*U-8G incorporates a different seating arrangement, Airstair door, and extended cabin.

1-51. Loading and Performance – Typical Mission, U-8D (Seminole).

CONDITIONS	BASIC MISSION	DESIGN MISSION	NORMAL MISSION	FERRY RANGE
TAKEOFF WEIGHT (lb) ...	7300 ^{4/}	7300 ^{4/}	7300 ^{4/}	6618 ^{4/}
Fuel at 6.0 lb/gal (grade 115/145) (lb) ...	1380	1062	1380	1380
Payload (outbound) (lb) ...	682	1000	682	None
Payload (inbound) (lb) ...	None	None	None	....
Wing loading (psf) ...	26.4	26.4	26.4	23.9
Stall speed (power off) (land config) (kn) ...	75.0	75.0	75.0	71.5
Takeoff ground run at SL ^{1/} (ft) ...	1430	1430	1430	1095
Takeoff to clear 50 ft ^{1/} (ft) ...	2385	2385	2385	1900
Rate of climb at SL ^{2/} (fpm) ...	1480	1480	1480	1780
Rate of climb at SL (one engine out) ^{2/} (fpm) ...	155	155	155	285
Time: SL to 10,000 ft ^{2/} (min) ...	7.8	7.8	7.8	6.5
Time: SL to 20,000 ft ^{2/} (min) ...	21.6	21.6	21.6	17.2
Service ceiling (100 fpm) ^{2/} (ft) ...	25,500	25,500	25,500	27,000
Service ceiling (one engine out) ^{2/} (ft) ...	9500	9500	9500	10,000
COMBAT RANGE (nmi) ...	1121	882	912	1185
Average cruising speed (kn) ...	140	140	171	139
Cruising altitude (ft) ...	10,000	10,000	10,000	10,000
Total mission time (hr) ...	8.08	6.43	5.45	8.55
COMBAT RADIUS ^{3/} (nmi) ...	528	387	430 ^{5/}	....
Average cruising speed (kn) ...	140	140	172	....
Cruising altitude (ft) ...	10,000	10,000	10,000	....
Total mission time (hr) ...	7.62	5.67	5.10	....
FIRST LANDING WEIGHT ^{3/} (lb) ...	6630	6768	6630	....
Ground roll at SL (ft) ...	1240	1266	1240	....
Total from 50 ft (ft) ...	2018	2063	2018	....
COMBAT WEIGHT ^{3/} (lb) ...	5948	5768	5948	5347
Combat altitude (ft) ...	10,000	10,000	10,000	10,000
Combat speed ^{2/} (kn) ...	199	199	199	200
Combat climb ^{2/} (fpm) ...	1550	1620	1550	1765
Combat ceiling (500 fpm) ^{2/} (ft) ...	24,100	25,000	24,100	26,500
Service ceiling (100 fpm) ^{2/} (ft) ...	29,700	30,500	29,700	31,700
Service ceiling (one engine out) ^{2/} (ft) ...	10,900	11,100	10,900	11,600
Takeoff ground run at SL ^{1/} (ft) ...	830	750	830	....
Takeoff to clear 50 ft ^{1/} (ft) ...	1485	1350	1485	....
Rate of climb at SL ^{2/} (fpm) ...	2010	2090	2010	2250

1-51. Loading and Performance – Typical Mission, U-8D (Seminole) (CONT).

CONDITIONS	BASIC MISSION	DESIGN MISSION	NORMAL MISSION	FERRY RANGE
Max speed at 9000 ft ^{2/} (kn) ...	200	200	200	200
Basic speed at 5000 ft ^{2/} (kn) ...	192	192	192	193
LANDING WEIGHT (lb) ...	5342	5445	5342	5347
Ground roll at SL (ft) ...	1000	1015	1000	1000
Total from 50 ft (ft) ...	1630	1640	1630	1630

^{1/} Max power.

^{2/} METO power.

^{3/} For RADIUS mission if radius is shown.

^{4/} Includes crew of 1 at 200 lb.

^{5/} 65-percent METO power used for cruise.

Performance Basis:

Phase IV flight test.

1-52. Performance Notes, U-8D (Seminole).**FORMULA: RADIUS MISSIONS I & II**

Warm up, take off, climb on course to 10,000 feet at METO power, cruise out at long range speeds to remote base, land, and discharge passengers and baggage. Without refueling, warm up, take off, climb on course to 10,000 feet at METO power, and return at long range speeds. Range-free allowances are 10 minutes of METO power for warmups and takeoffs, plus fuel for 20 minutes at speeds for long range at sea level, and 5 percent of initial fuel for reserve.

FORMULA: RADIUS MISSION III

Warm up, take off, climb on course to 10,000 feet at METO power, cruise out at 65 percent power to remote base, land, and discharge passengers and baggage. Without refueling, warm up, take off, climb on course to 10,000 feet at METO power, and return at 65 percent power. Range-free allowances are 10 minutes of METO power for warmups and takeoffs, plus fuel for 20 minutes at speeds for long range at sea level, and 5 percent of initial fuel for reserve.

FORMULA: RANGE MISSIONS I, II, & IV

Warm up, take off, climb on course to 10,000 feet at METO power, and cruise out at long range speeds until only reserve fuel remains. Range-free allowances are 5 minutes of METO power for warmup and takeoff, plus fuel for 20 minutes at speeds for long range at sea level, and 5 percent of initial fuel for reserve.

FORMULA: RANGE MISSION III

Warm up, take off, climb on course to 10,000 feet at METO power, and cruise out at 65 percent power until only reserve fuel remains. Range-free allowances are 5 minutes of METO power for warmup and takeoff, plus fuel for 20 minutes at speeds for long range at sea level, and 5 percent of initial fuel for reserve.

GENERAL DATA

Engine ratings shown are engine manufacturer's guaranteed ratings. Power values used in performance calculations for the O-480-1 engine are as follows:

	BHP	RPM	ALT	MIN
Max	340	3400	SL	5
METO	320	3200	SL	Cont.

PERFORMANCE REFERENCE

Beech Aerodynamic Report 691, Performance Data for the USAF Standard Aircraft Characteristics Charts from Phase IV Flight Test of the L-23D Airplane.

Beech Aerodynamic Report 725, U.S. Army Flight Manual Substantiating Data from USAF Phase IV Flight Tests (U-8D).

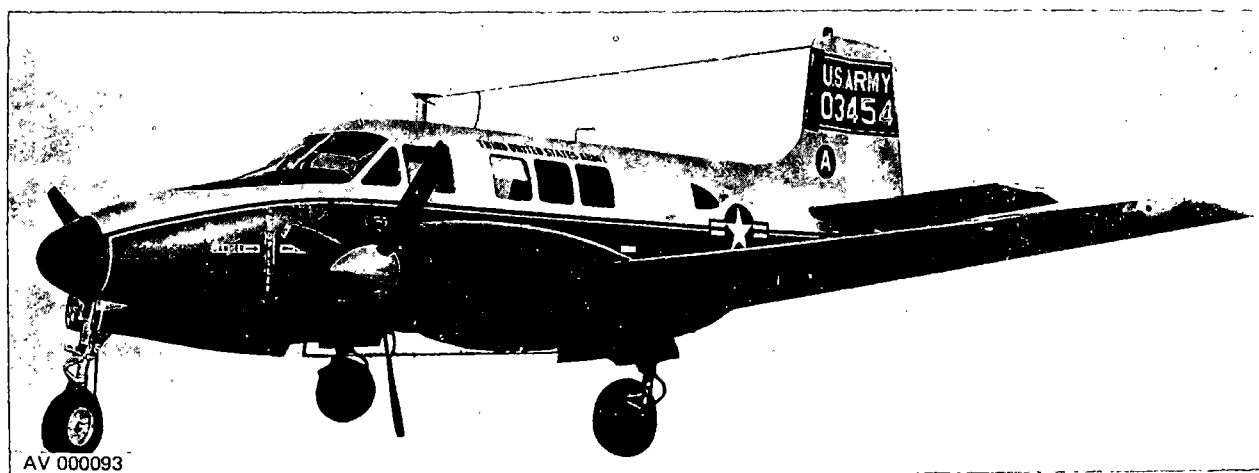
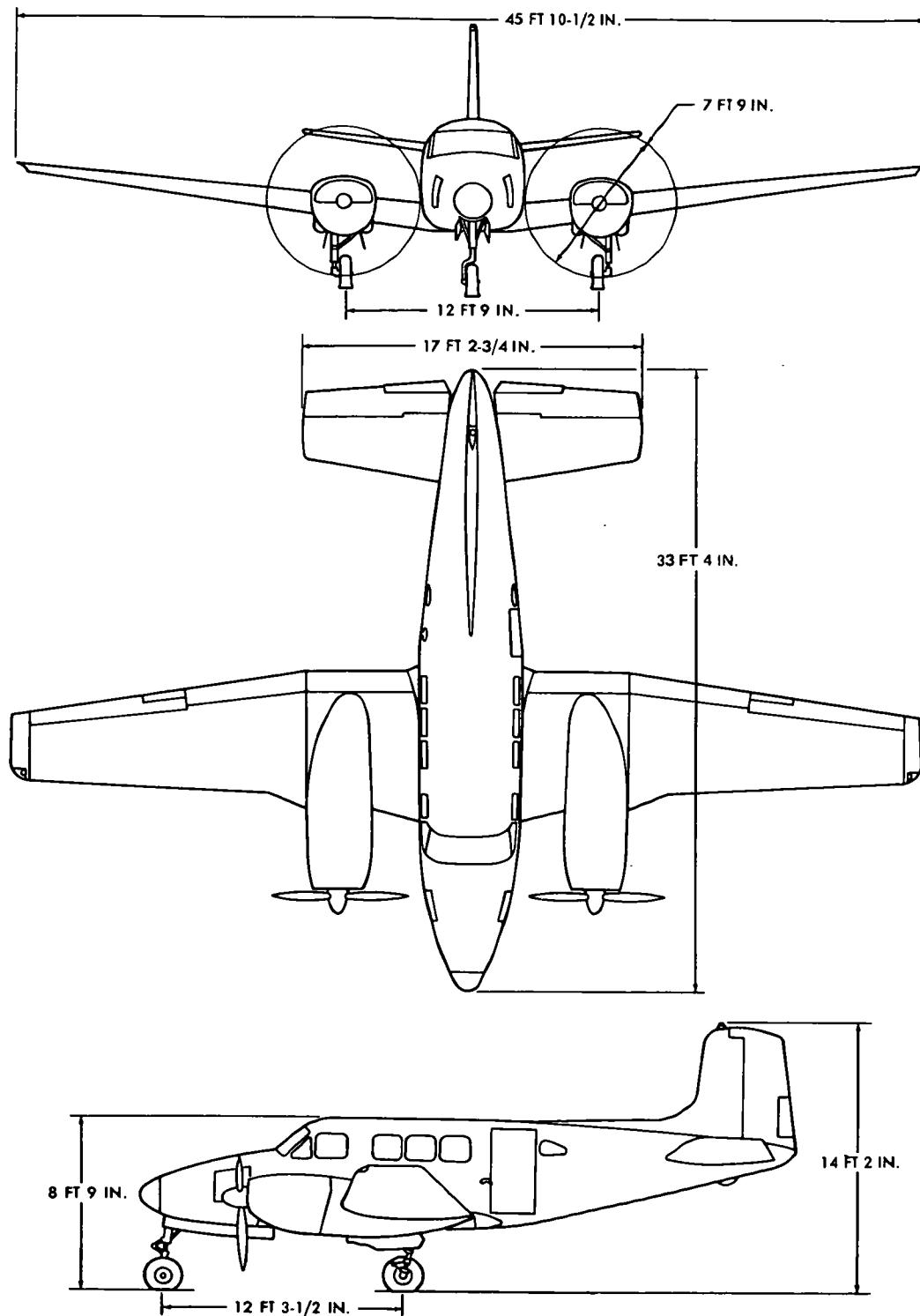


Figure 1-28. U-8F (Seminole)



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Figure 1-29. Principal dimensions, U-8F (Seminole)

1-54. Loading and Performance – Typical Mission, U-8F (Seminole).

CONDITIONS	BASIC MISSION	DESIGN MISSION	NORMAL MISSION	FERRY RANGE
TAKEOFF WEIGHT (lb) ...	7700 ^{4/}	7700 ^{4/}	7700 ^{4/}	6922 ^{4/}
Fuel at 6.0 lb/gal (grade 115/145) (lb) ...	1380	1158	1380	1380
Payload (outbound) (lb) ...	778	1000	778	None
Payload (inbound) (lb) ...	None	None	None	.....
Wing loading (lb/sq ft) ...	27.5	27.5	27.5	24.7
Stall speed (power off) (kn) ...	72	72	72	68
Takeoff ground run at SL ^{1/} (ft) ...	1320	1320	1320	1000
Takeoff to clear 50 ft ^{1/} (ft) ...	2200	2200	2200	1720
Rate of climb at SL ^{2/} (fpm) ...	1304	1304	1304	1550
Rate of climb at SL (one engine out) (fpm) ...	184	184	184	310
Time: SL to 10,000 ft ^{2/} (min) ...	8.1	8.1	8.1	6.8
Time: SL to 20,000 ft ^{2/} (min) ...	19.1	19.1	19.1	15.7
Service ceiling (100 fpm) ^{2/} (ft) ...	27,000	27,100	27,100	30,000
Service ceiling (one engine out) ^{2/} (ft) ...	7800	7800	7800	13,500
COMBAT RANGE (nmi) ...	1104	898	883 ^{5/}	1220
Average cruising speed (kn) ...	134	135	171	127
Cruising altitude (ft) ...	10,000	10,000	10,000	10,000
Total mission time (hr) ...	8.38	6.67	5.23	9.61
COMBAT RADIUS ^{3/} (nmi) ...	539	434	415 ^{5/}	.....
Average cruising speed (kn) ...	130	130	172	.....
Cruising altitude (ft) ...	10,000	10,000	10,000	.....
Total mission time (hr) ...	8.35	6.83	4.97	.....
FIRST LANDING WEIGHT ^{3/} (lb) ...	7054	7119	7044	.....
Ground roll at SL (ft) ...	1280	1310	1285	.....
Total from 50 ft (ft) ...	2025	2075	2030	.....
COMBAT WEIGHT ^{3/} (lb) ...	6276	6138	6266	5650
Combat altitude (ft) ...	10,000	10,000	10,000	10,000
Combat speed ^{2/} (kn) ...	203	203	203	204
Combat climb ^{2/} (fpm) ...	1685	1735	1670	1935
Combat ceiling (500 fpm) ^{2/} (ft) ...	27,200	27,700	27,100	29,800
Service ceiling (100 fpm) ^{2/} (ft) ...	32,500	32,900	32,400	34,600
Service ceiling (one engine out) ^{2/} (ft) ...	15,550	15,900	15,450	17,500
Takeoff ground run at SL ^{1/} (ft) ...	760	720	760	600
Takeoff to clear 50 ft ^{1/} (ft) ...	1355	1300	1360	1060
Max rate of climb at SL ^{2/} (fpm) ...	1825	1870	1820	2100
Max speed at 12,000 ft ^{2/} (kn) ...	207	207	207	208
Basic speed at 5000 ft ^{2/} (kn) ...	193	193	193	194
LANDING WEIGHT (lb) ...	5643	5632	5643	5643
Ground roll at SL (ft) ...	1065	1060	1065	1065
Total from 50 ft (ft) ...	1665	1660	1665	1665

^{1/}Maximum power – 3400 rpm.^{2/}Normal power – 3200 rpm.

1-54. Loading Performance — Typical Mission, U-8F (Seminole) (CONT).

3/For RADIUS mission if radius is shown.

4/Includes crew of 1 at 200 lb.

5/65-percent normal power used for cruise.

Performance Basis:

- a. Data source: Contractor's flight test.
- b. Performance is based on powers shown.

1-55. Performance Notes, U-8 F (Seminole).

FORMULA: RADIUS MISSIONS I & II

Warm up, take off, climb on course to 10,000 feet at normal power, cruise out at long range speeds to remote base, land, and discharge passengers and baggage. Without refueling, warm up, take off, climb on course to 10,000 feet at normal power, and return at long range speeds. Range-free allowances are 10 minutes of normal power for warmups and takeoffs, plus fuel for 20 minutes at speeds for long range at sea level, and 5 percent of initial fuel for reserve.

FORMULA: RADIUS MISSION III

Warm up, take off, climb on course to 10,000 feet at normal power, cruise out at 65-percent power to remote base, land, and discharge passengers and baggage. Without refueling, warm up, take off, climb on course to 10,000 feet at normal power, and return at 65-percent power. Range-free allowances are 10 minutes of normal power for warmups and takeoffs, plus fuel for 20 minutes at speeds for long range at sea level, and 5 percent of initial fuel for reserve.

FORMULA: RANGE MISSIONS I, II, & IV

Warm up, take off, climb on course to 10,000 feet at normal power, and cruise out at long range speeds until all but reserve fuel is consumed. Range-free allowances are 5 minutes of normal power for warmup and takeoff, plus fuel for 20 minutes at speeds for

long range at sea level, and 5 percent of initial fuel for reserve.

FORMULA: RANGE MISSION III

Warm up, take off, climb on course to 10,000 feet at normal power, and cruise out at 65-percent power until all but reserve fuel is consumed. Range-free allowances are 5 minutes of normal power for warmup and takeoff, plus fuel for 20 minutes at speeds for long range at sea level, and 5 percent of initial fuel for reserve.

PERFORMANCE REFERENCE

Beech Aerodynamic Report 677, Jackson, P.A., Type Inspection Report No. 50-20, Model 65 (L-23F), Gross Weight 7368 lb.

Beech Aerodynamic Report 678 and Appendixes A, B, C, and D, Hughes, A.C., Preliminary Flight-Test Evaluation L-23F Prototype.

Beech Aerodynamic Report 679, Jackson, P.A., Flight-Test Performance, Model 65 (L-23F), 7368 lb.

Beech Aerodynamic Report 695, Jackson, P.A., Type Inspection Report 65-2, Model 65 (L-23F), 7700 lb.

Beech Aerodynamic Report 732, Ross, H.C., U.S. Army Flight Manual Substantiating Data from Beech Flight Tests (L-23F).

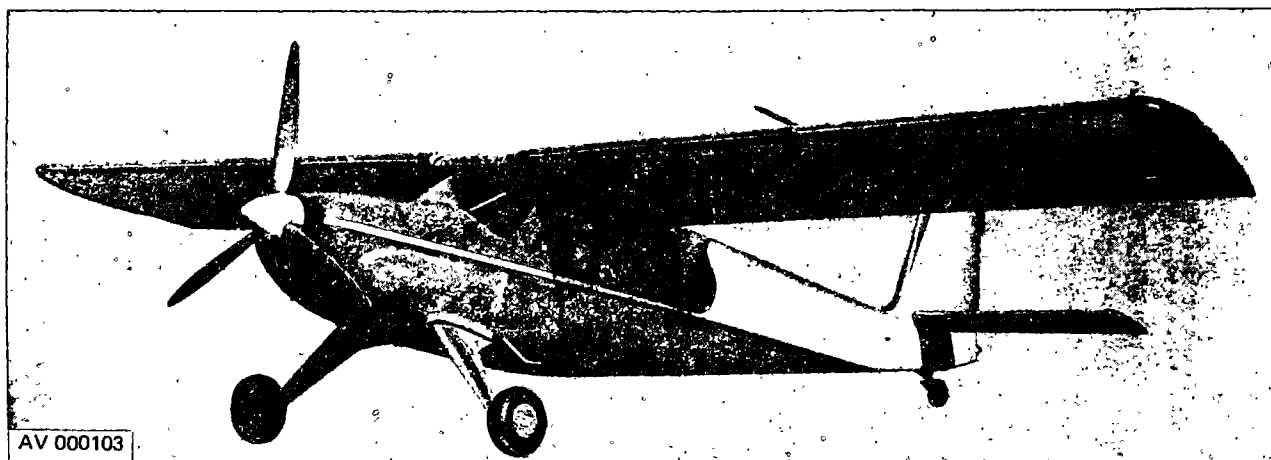
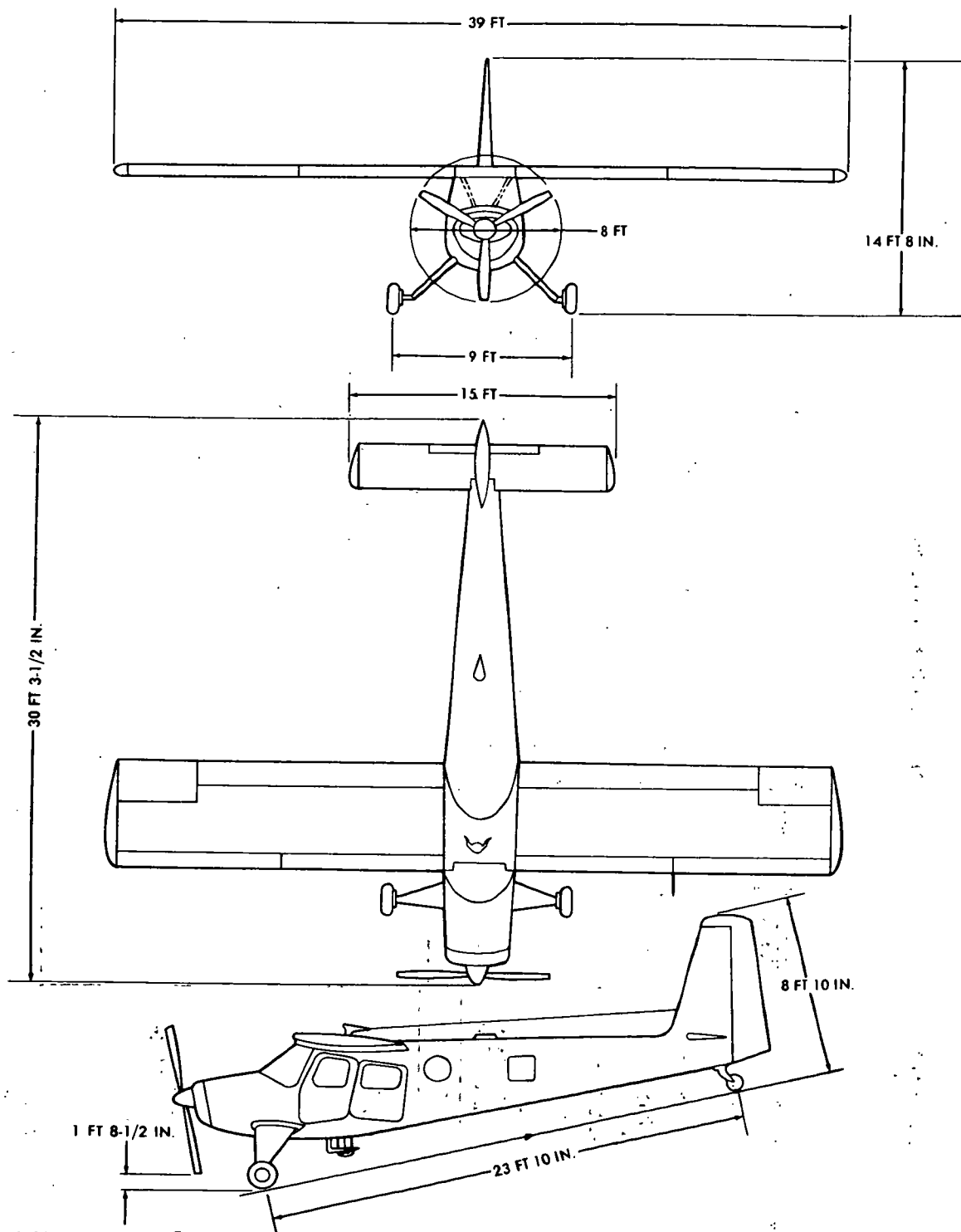


Figure 1-30. U-10A (Helio-Courier)



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Figure 1-31. Principal dimensions, U-10A (Helio-Courier)

1-56. U-10A (Helio Courier) Characteristics.

POWERPLANT	MISSION AND DESCRIPTION		WEIGHTS
No. & model .....(1) GO-480-G1D6 Engine spec No ....2227B Superch .....NA Red. gear ratio .....0.641 (77:120) Prop mfr .....Hartzell Blade design No ....B3Z20-1/10151c-5 Prop type .....Hydraulic, constant speed No. blades .....3 Prop dia .....8 ft Prop type certificate No.....P-907-10	Mfr's Model: Helio-Courier Basic mission assignments of the U-10A aircraft include courier, observation, cargo carrying, parachute delivery and small groups, radio relay for extended periods of time, evacuation, and utility transport. The U-10A is a versatile air vehicle in the STOL category specifically designed to utilize small, rough, and unprepared fields and offering a maximum of protection for pilot and crew. Adaptability to floats and skis enables the airplane to operate on water and snow. The U-10A is an all-metal, high-wing, conventional-gear, four-place aircraft. The aerodynamic characteristics feature such items as long-span, high-lift type slotted flaps, and full-span leading edge slots. Lateral control is obtained by short-span, Frise-type, balanced ailerons which are operated in conjunction with leading edge spoilers. Ailerons alone are used for lateral control at higher speed. The airplane has an all-movable, slab-type, horizontal stabilizer with antibalance tab and a large vertical stabilizer and rudder. The U-10A is powered by a six-cylinder engine splined to a three-bladed propeller with a constant-speed control and spinner to aid engine cooling.		Empty LB Max takeoff (normal) 2249 Max takeoff (overload) ... 3000 Max takeoff (overload) ... 3920
ENGINE RATINGS			FUEL AND OIL
Takeoff BHP RPM Normal 295 3400 Normal 280 2750			Fuel: Grade 115/145 Spec MIL-G-5572 No. tanks: Wing, left (1) 30 gal Wing, right (1) 30 gal Qty 60 gal Oil: Spec Temps above +30°F MIL-L-22851 Type II Temps below +30°F MIL-L-22851 Type III No. tanks 1 Location Engine sump Qty 2-1/2 gal
DIMENSIONS	PERSONNEL		AVIONICS
Wing: Span 39 ft Incidence 3 deg Dihedral 1 deg Sweepback (LE) outer panel 25 percent chord. 0.0 deg Sweepback (LE) center section 100 percent chord 0.0 deg Length 30 ft, 3-1/2 in. Height 8 ft, 10 in. Tread 9 ft Prop gnd clearance ... 1 ft, 8-1/2 in.	Crew (normal) (pilot, copilot) 2 Passengers 2		Refer to chapter 2.
			ARMAMENT
			None.

1-57. Loading and Performance – Typical Mission, U-10A (Helio Courier).

CONDITIONS	BASIC MISSION
Max speed at SL (kn)...	145
Max speed, 5000 ft (kn)...	142
Min speed, power off, 40-deg flaps (kn)...	42
Performance cruise at 6000 ft, 74-percent power, 2750 rpm (kn)...	139
Range at 139 kn (nmi)...	436 (no reserve)
Extended range cruise at 10,000 ft, 49-percent power, 2200 rpm (kn)...	121
Range at 121 kn (nmi)...	700 (no reserve)
Max endurance at 5000 ft, 29-percent power, 75 in TAS (hr)...	9.14 (no reserve)
Service ceiling (100 fpm R/C) (ft)...	22,000
Takeoff data at SL, 0 wing, 25-deg flaps, paved runway:	
Takeoff weight (lb)...	3000
Ground roll (ft)...	290
Total distance over 50-ft obstacle (ft)...	500
Landing data at SL, 0 wind, 40-deg flaps, paved runway:	
Ground roll (ft)...	180
Total distance over 50-ft obstacle (ft)...	495

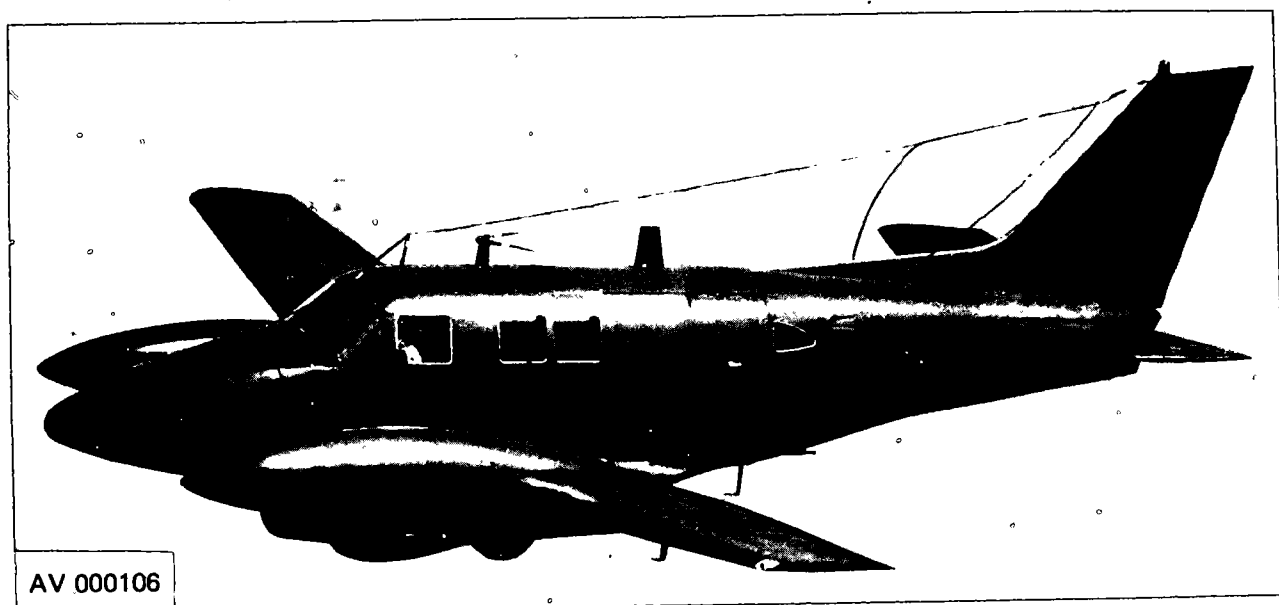
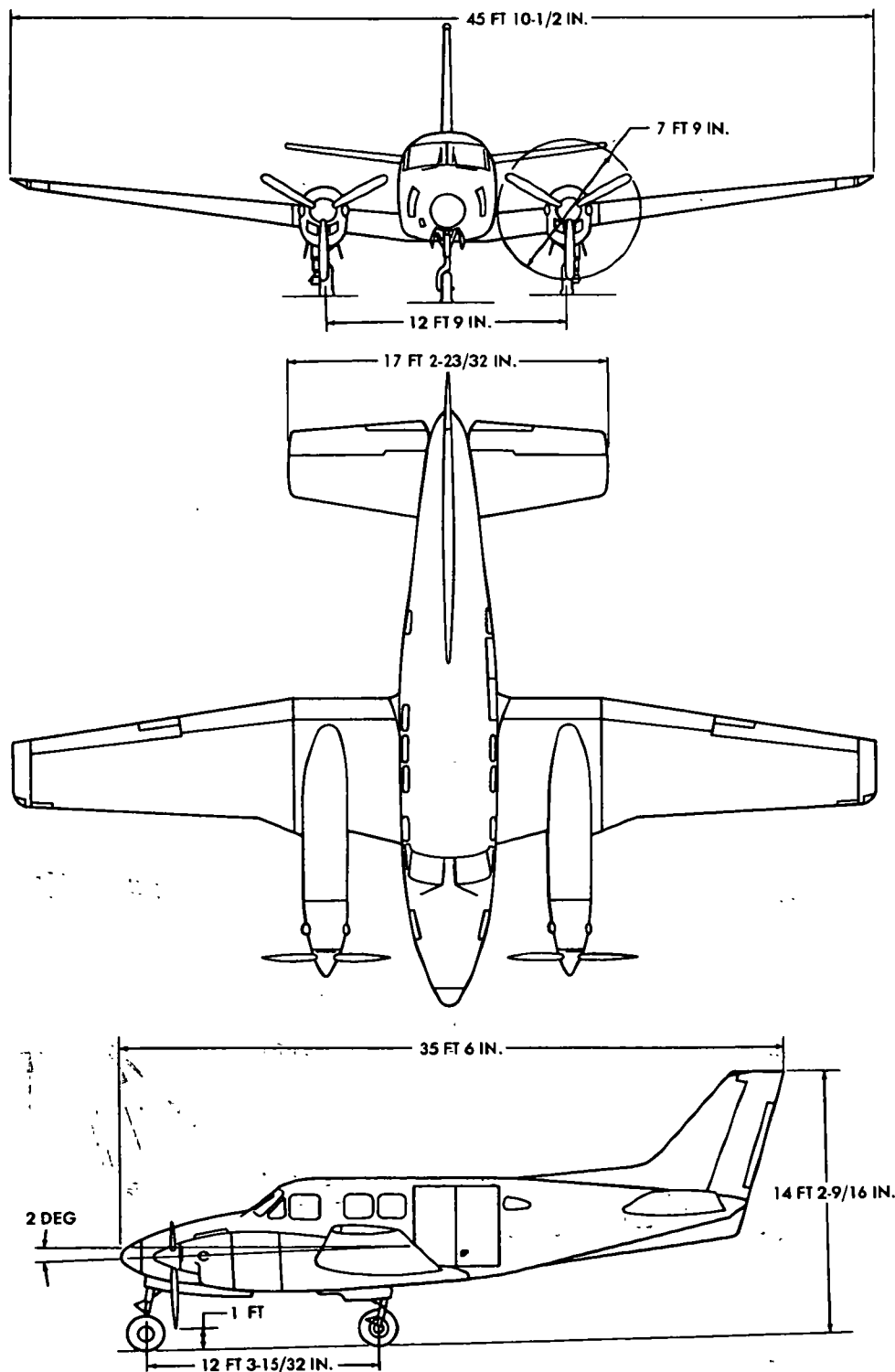
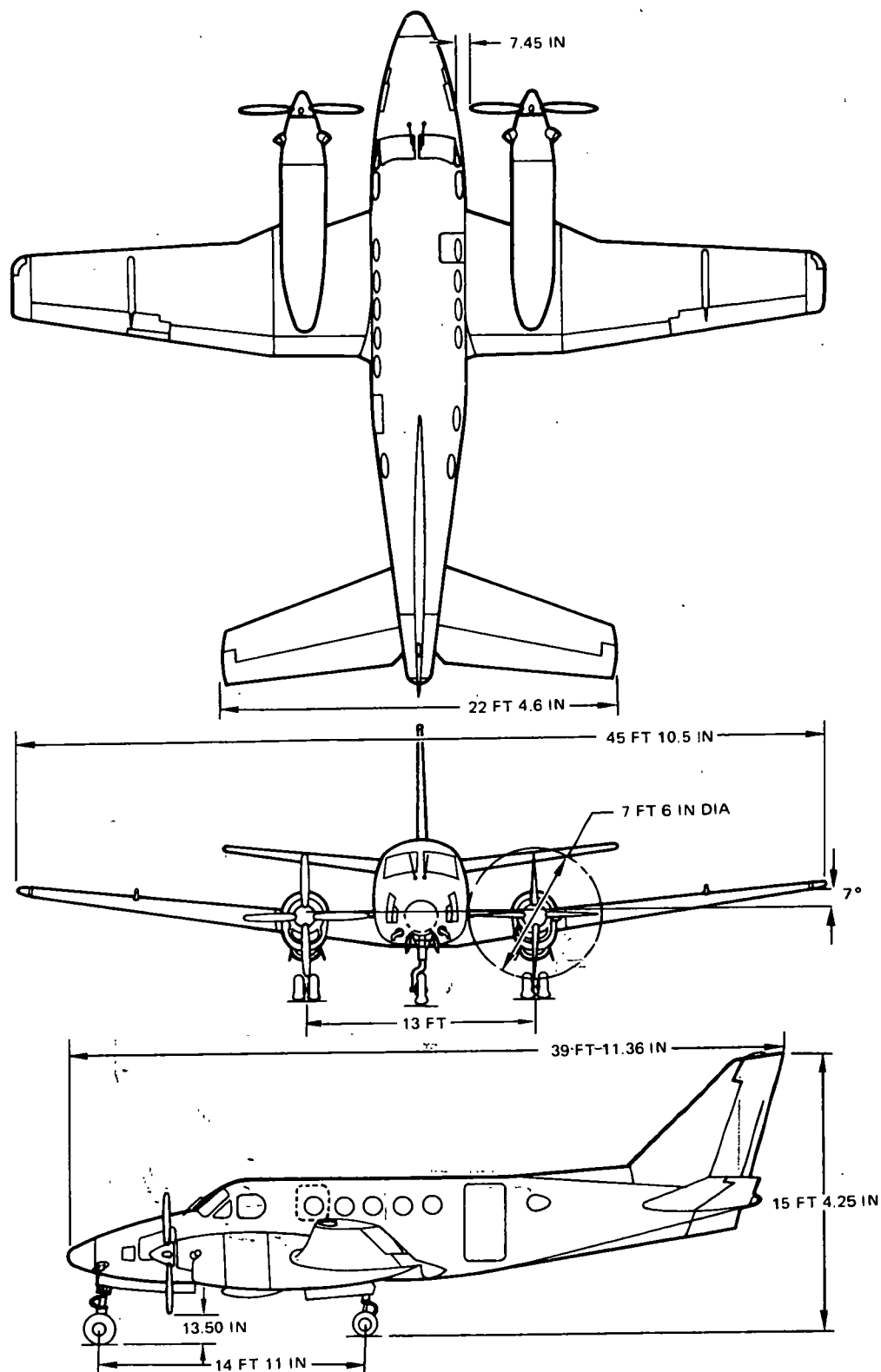


Figure 1-32. U-21A, RU-21A, and U-21G (Ute) (paint scheme differences)



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Figure 1-33. Principal dimensions, U-21A, RU-21A, U-21G, RU-21D, RU-21E (Ute)



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Figure 1-34. Principal dimensions U-21F (Ute)

1-58. U-21A and RU-21 A (UTE) Characteristics.

POWERPLANT		MISSION AND DESCRIPTION		WEIGHTS	
No. & model (2) T74-CP-700 (PT6A-20)		Mfr's Model: Beech Aircraft Corporation 65-A90-1		Empty LB Gross takeoff 5401 Gross landing 9650 Cargo capacity 3000	
Mfr UACL		The U-21A is an off-the-shelf utility aircraft. The first production aircraft was tested by USATECOM for confirmation.			
Type Turboprop		The U-21A is an unpressurized, low wing, all-metal construction aircraft of versatile design with an all-weather capability. The primary mission of the U-21A is to perform utility services in the combat zone, support commanders and their staff in command and control, administration, liaison and aeromedical evacuation. The basic version of the aircraft is configured for troop transport; however, alternate configurations are available for service as air ambulance, staff transport, or air cargo transport.			
Prop mfr Hartzell					
Prop type Hyd, CS, FF					
No. blades 3					
Prop dia 7 ft. 9 in.					
ENGINE RATINGS				FUEL AND OIL	
Takeoff SHP 550 ALT SL				Fuel:	
				Grade JP4/5	
				Spec MIL-T-5624	
				No. tanks . . . 10	
				Location . . . (8) wing	
				Qty 256 gal	
				Location . . . (2) Nacelle	
				Qty 114 gal	
DIMENSIONS		DEVELOPMENT		Oil:	
Wing		Date of contract 30 September 1966		Spec	
Span 45 ft. 10-1/2 in.		Contracting agency AVSCOM		Temps above	
Incidence		No. of test aircraft 3		-40°F MIL-L-23699	
(root) 4.8°		First flight (scheduled) March 1967		Temps below	
(tip) 0.0°		Completion of test and evaluation July 1967		-40°F MIL-L-7808	
Dihedral 7°		Contract delivery schedule 2 April 1967		No. tanks . . . 2	
Sweepback (LE) . 0.0°				Location . . . Nacelle	
Sweepforward				Qty 2.3 gal each tank	
(TE) NVAL					
Length 35 ft. 6 in.		FEATURES	PERSONNEL		
Height 14 ft. 2-1/2 in.		Cabin heating and ventilating system.	Pilot 1	AVIONICS	
Tread 12 ft. 9 in.		Deicing and anti-icing system.	1/Passengers 6		
Prop gnd clearance 1 ft.		Rotating beacon light.	or	Refer to chapter 2.	
		Steerable nose wheel.	2/Troops 10		
		Controllable pitch, full feathering, and reversible props.	or	ARMAMENT	
			Litter patients 3		
			plus		
			Ambulatory patients 3		
			plus		
			Attendant 1		
			1/Normal seats		
			2/Combat - equipped		

Note:

RU-21A: U-21A Modified for installation of special mission EW equipment.

1-59. Performance – Typical Mission, U-21A (UTE).

Payload	(lb) . .	2000 ^{1/}
Range	(nmi) . .	1249
Cruise speed ^{2/}	(kn) . .	180
Max speed	(kn) . .	230
Min takeoff distance	(ft) . .	1000
Min landing distance	(ft) . .	800
Rate of climb (1 engine).	(fpm) . .	350
Service ceiling (2 engines)	(ft) . .	25,000
Service ceiling (1 engine)	(ft) . .	10,000

^{1/} 3000 lb with fuel trade off.

^{2/} True airspeed at normal rated power.

1-60. RU-21D and RU-21E (UTE) Characteristics.

POWERPLANT		MISSION AND DESCRIPTION		WEIGHT	
No. & model (2) T74-CP-700 (PT6A-20) Mfr UACL Type Turboprop Prop mfr Hartzell Prop type Hyd, CS, FF No. blades 3 Prop dia 7 ft. 9 in.		Mfr's Model: Beech Aircraft Corporation 65-A90-1 The RU-21D and RU-21E are U-21A aircraft modified to carry special mission equipment. The RU-21D and RU-21E are unpressurized, low wing, all-metal construction aircraft of versatile design with an all-weather capability. The primary mission of the RU-21D and RU-21E is to perform special missions in the combat zone.		LB Empty (wet) 6497 Gross takeoff 9650 Gross landing 9168 Cargo capacity 3000	
ENGINE RATINGS		DEVELOPMENT		FUEL AND OIL	
Takeoff SHP 550 ALT SL		Date of contract RU-21D RU-21E 2 FEB 68 17 APR 70 Contracting agency AVSCOM AVSCOM No. of test aircraft — — First flight (scheduled) MAY 68 JUN 71 Completion of test and evaluation — — Contract delivery schedule JUL 68 AUG 71 OCT 68 MAY 22		Fuel: Grade JP4/5 Spec MIL-T-5624 No. tanks 10 Location (8) wing Qty 256 gal Location (2) Nacelle Qty 114 gal Oil: Spec Temps above -40°F MIL-L-23699 Temps below -40°F MIL-L-7808 No. tanks 2 Location Nacelle Qty 2.3 gal each tank	
DIMENSIONS		FEATURES	PERSONNEL		
Wing Span 45 ft. 10-1/2 in. Incidence (root) 4.8° (tip) 0.0° Dihedral 7° Sweepback (LE) 0.0° Sweepforward (TE) NVAL Length 35 ft. 6 in. Height 14 ft. 2-1/2 in. Tread 12 ft. 9 in. Prop gnd clearance 1 ft.		Cabin heating and ventilating system. Deicing and anti-icing system. Rotating beacon light. Steerable nose wheel. Controllable pitch, full feathering, and reversible props.	Pilot 1 Co-Pilot 4 Equipment Operators 2		
				AVIONICS	
				Refer to chapter 2.	
				ARMAMENT	
				None.	

1-61. Performance – Typical Mission, RU-21D and RU-21E (UTE).

Payload	(lb) ..	1,767 ^{1/}
Range	(nmi) ..	800
Cruise speed ^{2/}	(kn) ..	176
Max speed	(kn) ..	230
Min takeoff distance	(ft) ..	1,700
Min landing distance	(ft) ..	1,280
Rate of climb (1 engine)	(fpm) ..	410
Service ceiling (2 engines)	(ft) ..	25,750
Service ceiling (1 engine)	(ft) ..	9,100

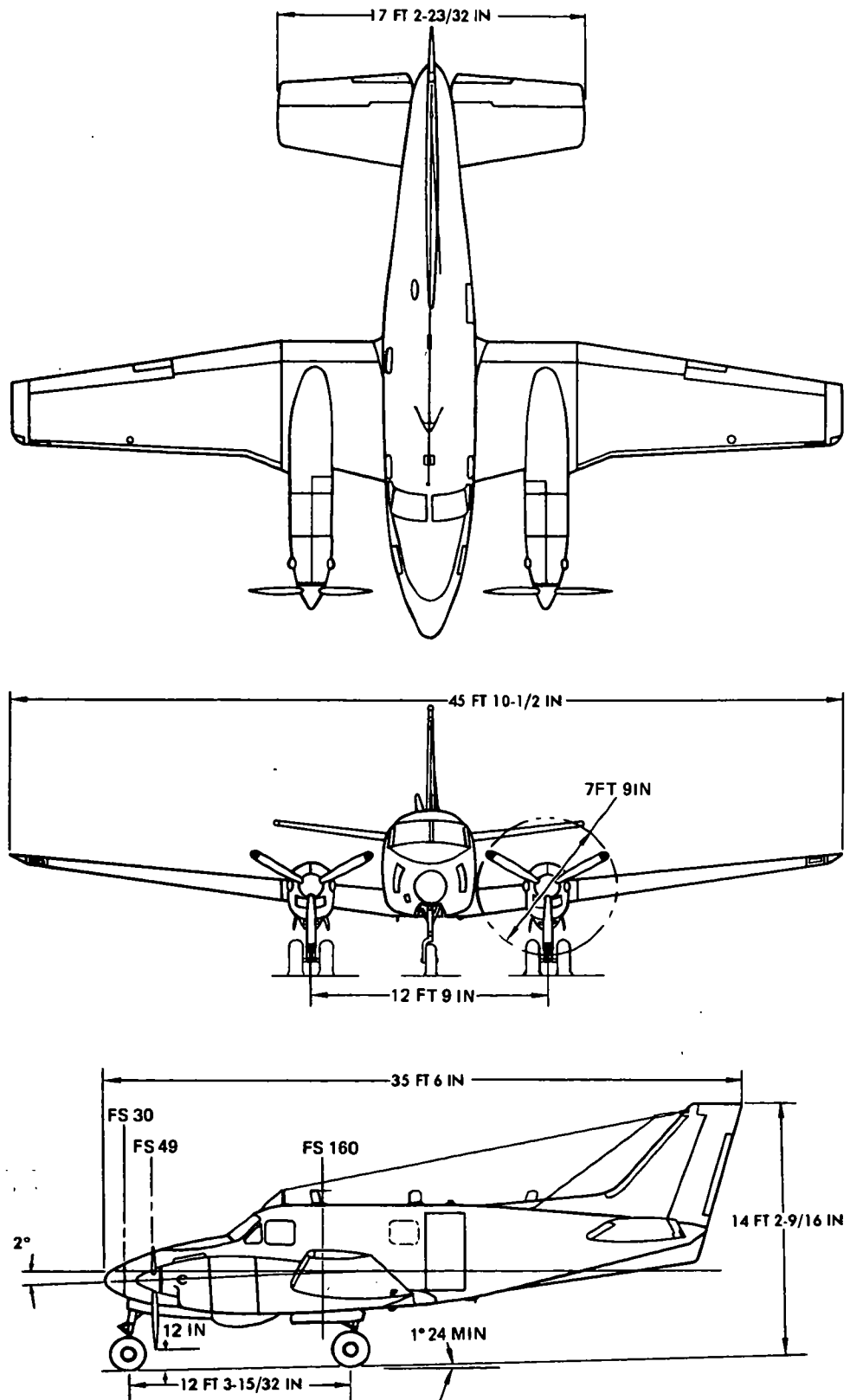
^{1/}Mission equipment and two operators.^{2/}True airspeed at normal rated power.

[illegible]

1-63. Performance — Typical Mission, U-21F (UTE).

Payload	(lb) ..	1,400 <u>1/</u>
Range	(nmi) ..	1,000
Cruise speed <u>2/</u>	(kn) ..	236
Max speed	(kn) ..	270
Min takeoff distance	(ft) ..	1,855
Min landing distance	(ft) ..	866
Rate of climb (1 engine)	(fpm) ..	452
Service ceiling (2 engines)	(ft) ..	24,850
Service ceiling (1 engine)	(ft) ..	9,300

1/3000 lb with fuel trade off.2/True airspeed at normal rated power.



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Figure 1-35. Principal dimensions RU-21B and RU-21C (Ute)

1-64. RU-21B and RU-21C (UTE) Characteristics.

POWERPLANT	MISSION AND DESCRIPTION		WEIGHTS
No. & model (2) T74-CP-702 (PT6A-29) Mfr UACL Type Turboprop Prop mfr Hartzell Prop type Hyd, CS, FF No. blades 3 Prop dia 7 ft. 9 in.	Mfr's Model: Beech Aircraft 65-A90-2 (RU-21B) 65-A90-3 (RU-21C) The RU-21 B & C models are modified U-21A to carry special ASA mission equipment. They have engines with greater SHP, are beefed up to accomodate higher gross weight, and are equipped with dual wheel landing gears.		Empty RU-21B 5955 RU-21C 5907 Gross takeoff 10,900 Gross landing 10,900
ENGINE RATINGS	DEVELOPMENT		FUEL AND OIL
Takeoff SHP 620 . ALT SL	Date of contract, Amendment 12 Jun 1967 Contracting agency AVSCOM No. of test aircraft 2 First Flight (Scheduled) Aug 1968 Completion of Test and Evaluation Final test not completed Contract Delivery Schedule (Est Apr 72)		Fuel: Grade JP4/5 Spec MIL-T-5624
DIMENSIONS			B MODEL
Wing Span 45 ft. 10-1/2 in. Incidence (root) 4.8° (tip) 0.0° Dihedral 7° Sweepback (LE) . 0.0° Sweepforward (TE) NVAL Length 35 ft. 6 in. Height 14 ft. 2 1/2 in. Tread 12 ft. 9 in. Prop gnd clearance 1 ft.			No. Tanks 12 Location (10) Wing Qty 290 gals Location (2)Nacelle Qty 106 gals
		PERSONNEL	C MODEL
FEATURES		Pilot 1 Copilot 1 Mission Equipment Operator RU-21B 3 RU-21C 2 Passengers 0	No. Tanks (10) Location (8) wing Qty 260 gals Location (2) Nacelle Qty 106 gals Oil: Spec Below 40°F(25°) MIL-L-7808 Above 40°F(25°C) MIL-L-23699 No. tanks 2 Location Nacelle Qty 2.3 gal each tank
			AVIONICS
			Refer to chapter 2.
			ARMAMENT
			None.

1-65. Performance – Typical Mission, RU-21B/RU-21C (UTE).

Payload	(lb)	1371 ^{1/}	B Model
		1658 ^{1/}	C Model
Range	(nmi)	940	B Model
		940	C Model
Cruise speed	(kn)	194	
Max speed	(kn)	208	
Min takeoff distance	(ft)	2860	B Model
Min takeoff distance	(ft)	2140	C Model
Min landing distance	(ft)	1750	B Model
Min landing distance	(ft)	1360	C Model
Rate of climb (1 engine)	(fpm)	208	B Model
Rate of climb (1 engine)	(fpm)	365	C Model
Service ceiling (2 engines)	(ft)	20,000	
Service ceiling (1 engine)	(ft)	7,000	

^{1/} Mission Equipment

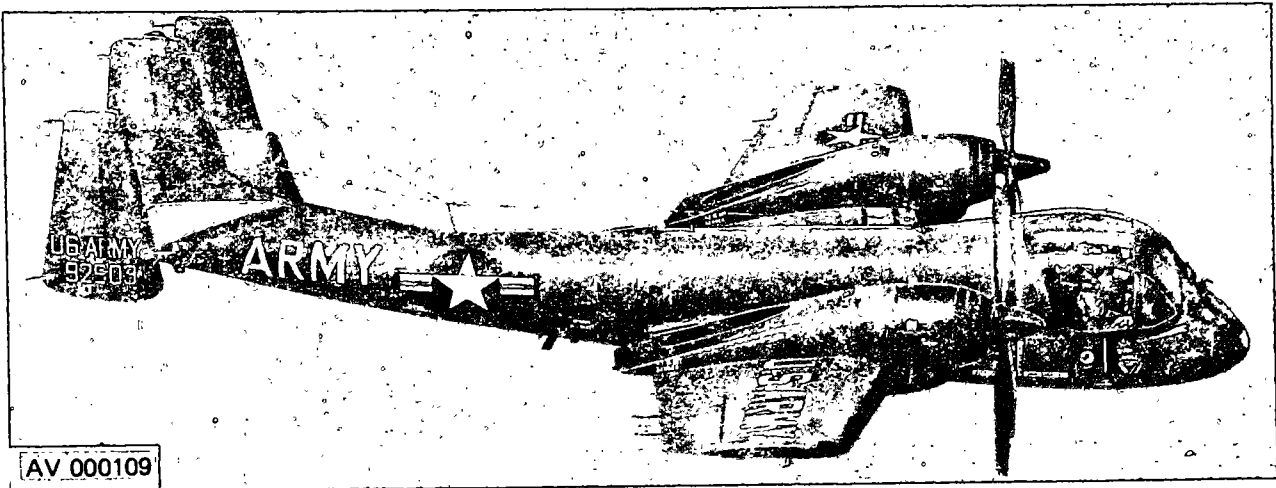


Figure 1-36. OV-1A, and C (Mohawk), typical, (minor differences apparent between A and C models)

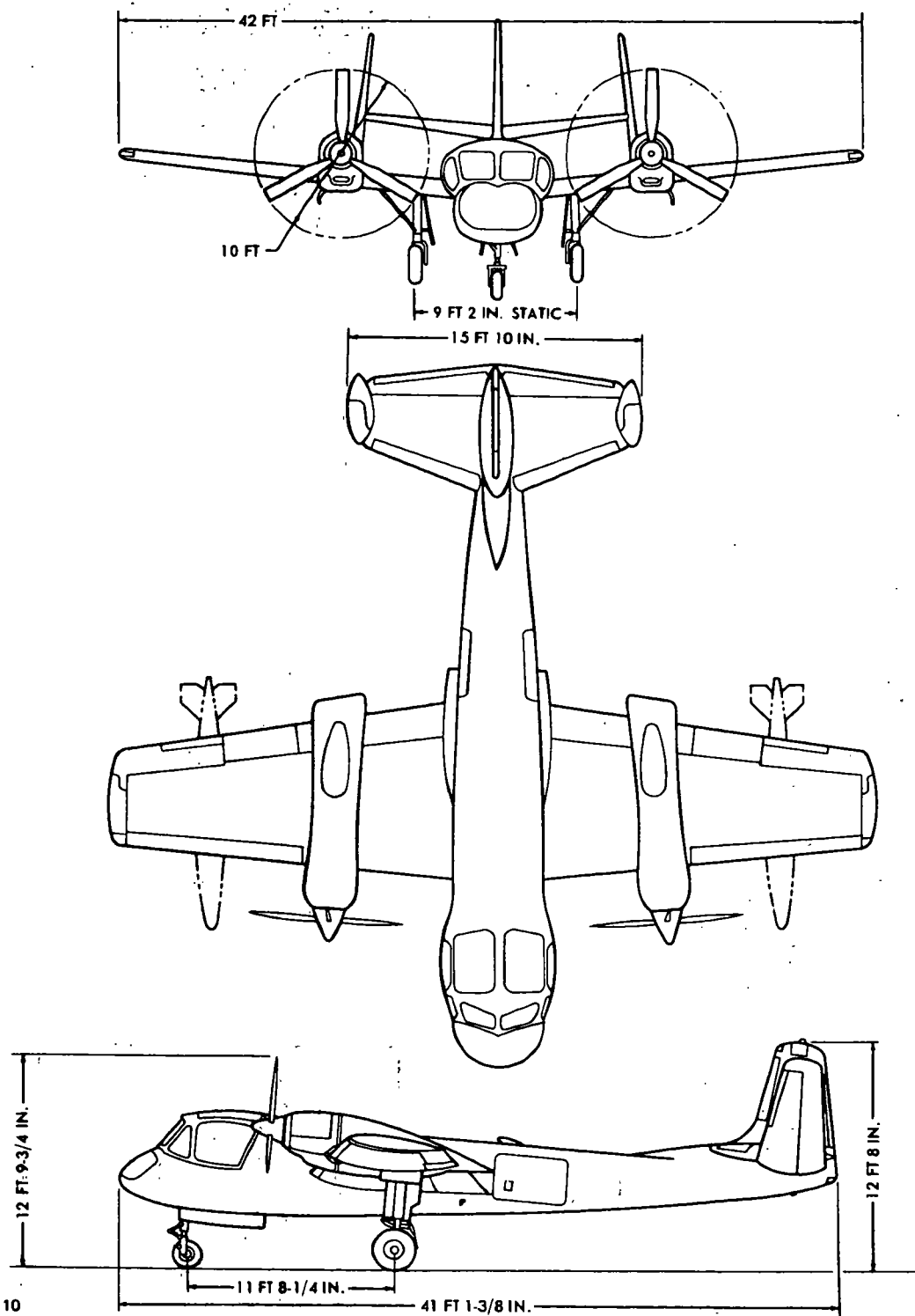


Figure 1-37. Principal dimensions, OV-1A and C (Mohawk)

1-66. OV-1A (Mohawk) Characteristics.

1-66. OV-1A (Mohawk) Characteristics.					
POWERPLANT		MISSION AND DESCRIPTION	WEIGHTS		
No. & model. . . .	(2) T-53-L-7		LB	L.F.	
Mfr	Lycoming		Empty	9,400	
Type	Free power turbine		Basic	9,781	
Engine spec No . .	104.11	Design	11,715	5.0	
Red. gear ratio . .	12.46	Combat (basic mission)	11,252		
Prop mfr	Ham std	Normal takeoff.	12,012		
Blade design No . .	7103-6	Max takeoff . . .	15,020		
No. blades	3	Max landing . . .	15,020		
Prop dia	10 ft				
ENGINE RATINGS		DEVELOPMENT	FUEL AND OIL		
Rating/SL	SHp		SFC	Output	
Max(takeoff)	1100		.670	1700	
Mil	1000		.679	1700	
NRP	900	.692	1700		
DIMENSIONS		First flight (prototype) April 1960 Estimated first service use September 1960	Fuel:		
Wing:			Grade	JP-4	
Area	330 sq ft		Spec	MIL-T-5624	
Span	42 ft		No. tanks:		
MAC	98 in.	Fuselage . . .	(1) 292-1/2 gal		
Length	41 ft, 1-172 in	External . . .	(2) 150 gal		
Height	12 ft, 8 in	Total qty . . .	592-1/2 gal		
Tread	9 ft, 2 in.	Oil:			
		Spec	MIL-L-23699		
		Qty	5 gal		

1-67. Loading and Performance – Typical Mission, OV-1A (Mohawk).

TAKEOFF LOADING CONDITION	OBSERVATION, NO STORES	NIGHT PHOTO TWO A6 EJECTORS	EMERGENCY RESUPPLY, TWO RESUPPLY CONTAINERS	FERRY, TWO 150-GAL EXT TANKS
	1	3	5	7
TAKEOFF WEIGHT (lb)...	12,012	12,273	13,647	14,371
Fuel (lb)...	1901	1901	1901	1901/1950
Payload (lb)...	....	264	1500	....
Wing loading (lb/sq ft)...	36.4	37.2	41.4	43.5
Stall speed (power-off) ^{1/} (kn)...	68	69	74	76
Takeoff run at SL – calm (ft)...	660 ^{9/}	722 ^{9/}	825 ^{7/}	1005 ^{7/}
Takeoff run at SL – 25-kn wind (ft)...	270 ^{9/}	320 ^{9/}	355 ^{7/}	430 ^{7/}
Takeoff to clear 50 ft – calm (ft)...	1010 ^{9/}	1080 ^{9/}	1255 ^{7/}	1450 ^{7/}
Max speed/altitude ^{1/} (kn/ft)...	260/10,000	257/10,000	245/9000	244/8000
Rate of climb at SL ^{1/} (fpm)...	2675	2560	2100	1935
Time: SL to 20,000 ft ^{1/} (min)...	11.0	12.0	16.0	18.5
Time: SL to 25,000 ft ^{1/} (min)...	16.5	18.4	28.0	35.0
Service ceiling (100 fpm) ^{1/} (ft)...	(Service ceiling above 25,000 ft)			23,800
COMBAT RANGE ^{3/} (nmi)...	433	424	390	1195
Average cruising speed (kn)...	200	200	200	205
Cruising altitude(s) (ft)...	5000	5000	5000	20,000
Cruise time (hr)...	2.14	2.09	1.92	5.63
Mission time (hr)...	2.17	2.13	1.96	5.93
COMBAT LOADING CONDITION	NO STORES	TWO A6 EJECTORS	TWO RESUPPLY CONTAINERS	
	2	4	6	8
COMBAT WEIGHT (60 percent internal fuel) (lb)...	11,252	11,513	12,887	....
Engine power Military	Military	Military	Military	....
Fuel (lb)...	1141	1141	1141	....
Combat speed/combat altitude (kn/ft)...	269/5000	266/5000	255/5000	....
Rate of climb/combat altitude (fpm/ft)...	2860/5000	2752/5000	2253/5000	....
Combat ceiling (1500 fpm) (ft)...	(Combat ceiling above 25,000 ft)			....
Rate of climb at SL (fpm)...	3310	3185	2645	....
Max speed at SL (kn)...	264	261	251	....
Max speed/altitude (kn/ft)...	270/10,000	267/10,000	256/8000	....
LANDING WEIGHT (10 percent internal fuel) (lb)...	10,301	10,562	11,936	....
Fuel (lb)...	190	190	190	....
Stall speed-power-off ^{4/} approach power ^{2/} (kn)...	60/53	61/54	65/57	....
Landing distance to clear 50-ft obstacle – calm .. (ft)...	858 ^{9/}	878 ^{9/}	1300 ^{8/}	....

^{1/} Normal rated power.^{2/} Military rated power.

1-67. Loading and Performance – Typical Mission, OV-1A (Mohawk) (CONT).

3 See notes on mission specifications.

4 Flt idle power, propeller control at max rpm.

5 Power for level flight at 120 percent of stall speed-power off, propeller control at max rpm.

6 Takeoff distances are based upon takeoff and obstacle speeds satisfying minimum speeds for single-engine control and positive rate of climb as per detail spec 532-1..

7 Takeoff distances are based upon takeoff and obstacle speeds satisfying single-engine control.

8 Landing distance is based on a rate of sink of 8 ft per second.

9 Landing distance is based on a rate of sink of 14 ft per second.

1-68. Loading and Performance — Typical Mission, OV-1A (Mohawk).

TACTICAL AIR OBSERVATION MISSION AND NIGHT PHOTOGRAPHY (Columns 1, 3, and 5, paragraph 1-67).

Warm up, taxi, take off, climb on course to 5000 feet at normal rated power, and cruise at 200 knots at 5000 feet until all but reserve fuel is consumed. Range-free allowances are 5 minutes at normal rated power for warmup, taxi, and takeoff, plus 10 percent of initial internal fuel for reserve.

FERRY MISSION (Column 7, paragraph 1-67).

Warm up, taxi, take off, and climb on course to altitude for maximum range at normal rated power, cruise at altitude and velocity for maximum range until all but reserve fuel is consumed, and drop external fuel tanks when empty. Range-free allowances are 5 minutes at normal rated power for warmup, taxi, and takeoff, plus 10 percent of initial internal fuel for reserve.

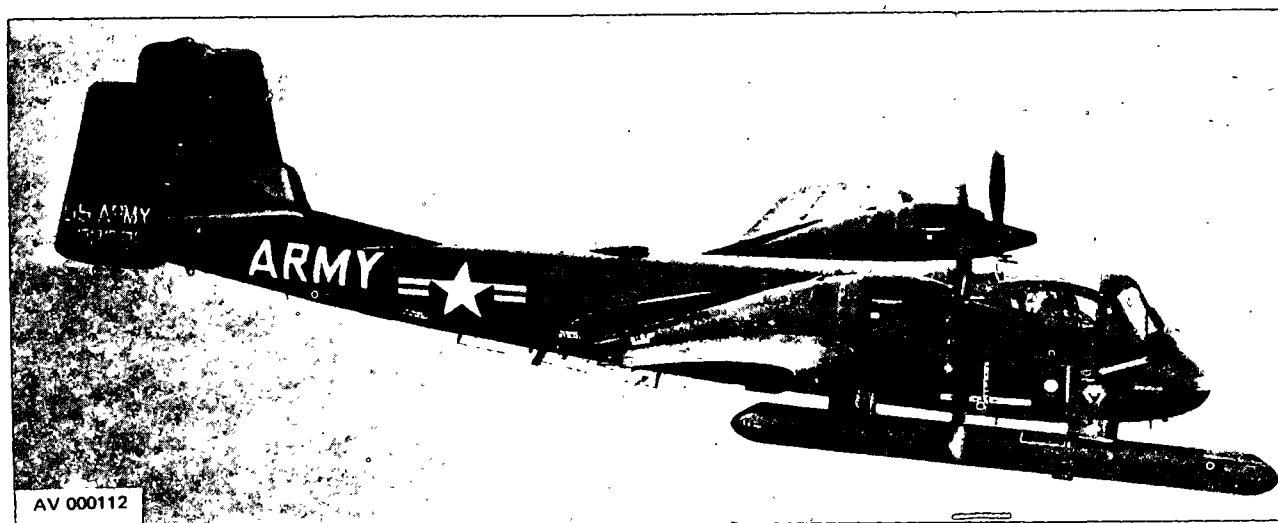


Figure 1-38. OV-1B (Mohawk)

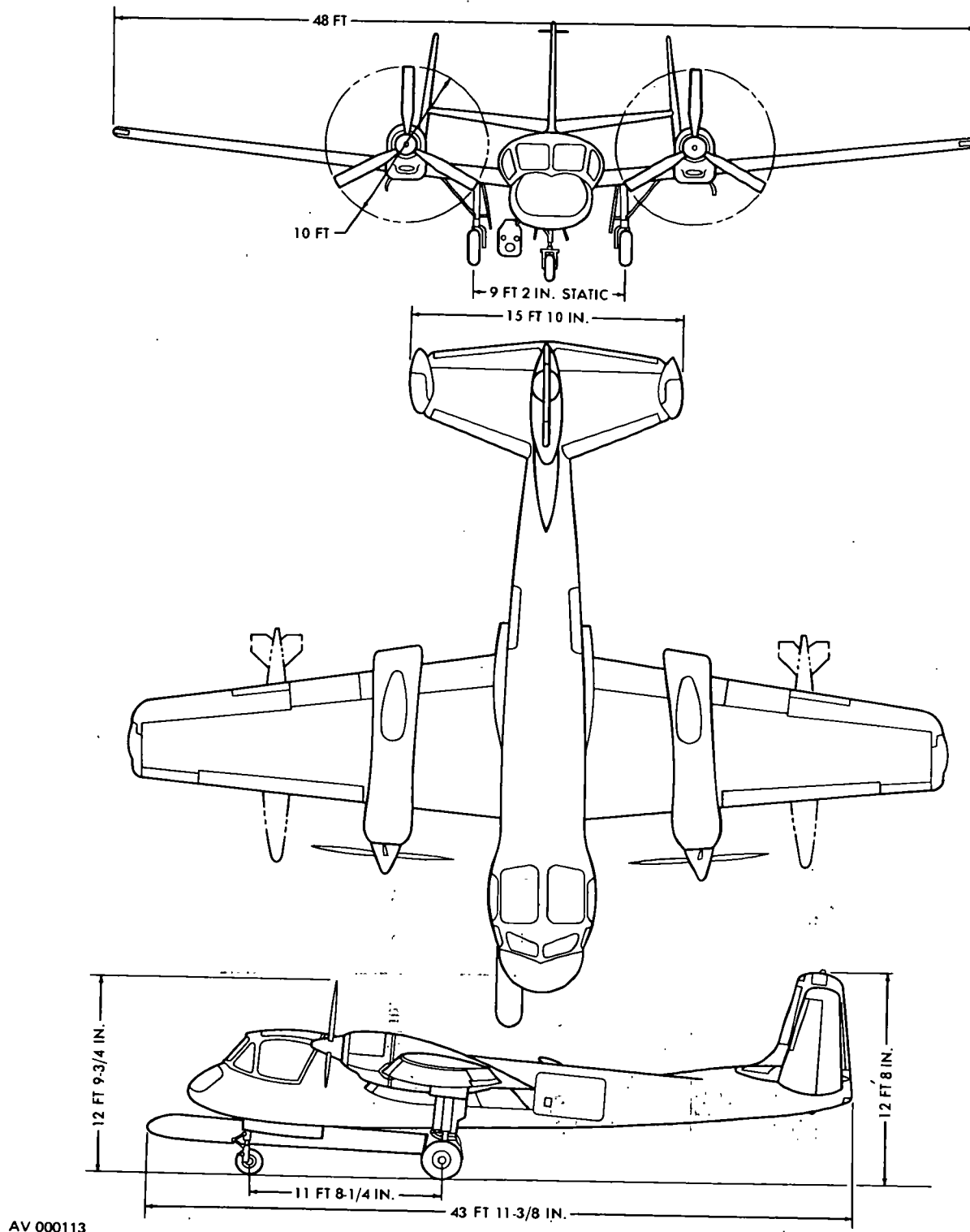


Figure 1-39. Principal dimensions, OV-1B (Mohawk)

1-69. OV-1B (Mohawk) Characteristics.

POWERPLANT	MISSION AND DESCRIPTION	WEIGHTS
No. & model (2) T53-L-7 Mfr Lycoming Type Free power turbine Engine spec No .. 104.21B & .11C Red. gear ratio ... 12.4 Prop mfr Ham std Blade design No . 7125-6 No. of blades ... 3 Prop dia 10 ft	Mfr's Model: Grumman The primary mission of the OV-1B is electronic surveillance using the sidelooking airborne radar (SLAR). In addition, it is capable of performing missions of photographic reconnaissance, visual reconnaissance and observation, artillery gunfire spotting, air control, and radiological monitoring. The OV-1B is a two-place, twin-turboprop aircraft capable of operating from small fields and unimproved runways. Design features include a midwing, three-tail configuration of semimonocoque construction equipped with wide span flaps. The crew of two are seated side-by-side within a bubbled enclosure at the extreme forward end of the fuselage. A remotely operated day-and-night KA-30 camera installation provides horizon-to-horizon photo coverage along the aircraft flight path. The OV-1B carries an APS-94 side looking airborne radar antenna as standard equipment. External provisions are incorporated to carry two 150-gallon fuel tanks or two resupply containers.	Empty E 10,983 LB Basic 11,217 L.F. Design 13,100 4.0 Combat (basic mission) 12,882 Normal takeoff . 13,654 Max takeoff ... 16,643 Max landing ... 16,643
ENGINE RATINGS	DEVELOPMENT	FUEL AND OIL
Rating/SL SHP SFC RPM Max (takeoff) 1100 0.670 1700 Mil 1000 0.679 1700 NRP 900 0.692 1700		Fuel: Grade JP-4 Spec MIL-T-5624 No. tanks: Fuselage (1) 297 gal External (2) 150 gal Total Qty ... 597 gal Oil: Spec MIL-L-23699 Qty 5 gal
DIMENSIONS	DEVELOPMENT	AVIONICS
Wing: Area 360 sq ft Span 48 ft MAC 94.8 in. Length 43 ft. 11-1/2 in. Height 12 ft. 8 in. Tread 9 ft. 2 in.		Refer to chapter 2.
		ARMAMENT
		Refer to chapter 2.

1-70. Loading and Performance — Typical Mission, OV-1B (Mohawk).

TAKEOFF LOADING CONDITION	OBSERVATION, NO STORES 1	NIGHT PHOTO, TWO A6 EJECTORS 3	EMERGENCY RESUPPLY, TWO RESUPPLY CONTAINERS 5	FERRY, TWO 150-GAL EXT TANKS 7
TAKEOFF WEIGHT (lb) ...	13,654	13,915	15,168	15,918
Fuel internal/external (lb) ...	1930	1930	1930	1930/1950
Payload (lb) ...	....	264	1500	....
Wing loading (lb/sq ft) ...	38	38.7	42.1	44.6
Stall speed (power-off) ^{4/} (kn) ...	73	73.8	77	79
Takeoff run at SL — calm (ft) ...	995	1040	1270	1410
Takeoff to clear 50 ft — calm (ft) ...	1625	1690	2000	2185
Max speed/altitude ^{1/} (kn/ft) ...	240.5/12,500	238/12,000	226.8/10,000	226/8000
Rate of climb at SL ^{2/} (fpm) ...	2800	2700	2320	2160
Time: SL to 20,000 ft ^{2/} (min) ...	9.5	10	13	15
Time: SL to 25,000 ft ^{2/} (min) ...	15.5	16	23	26.5
Service ceiling (100 fpm) ^{2/} (ft) ...	29,500	28,750	26,500	24,900
COMBAT RANGE ^{3/} (nmi) ...	365	358	334	1053
Average cruising speed (kn) ...	200	200	200	203
Cruising altitude (s) (ft) ...	5000	5000	5000	20,000
Cruise time (hr) ...	1.80	1.77	1.64	4.98
Mission time (hr) ...	1.84	1.80	1.69	5.30
COMBAT LOADING CONDITION	NO STORES 2	TWO A6 EJECTORS 4	TWO RESUPPLY CONTAINERS 6	
COMBAT WEIGHT (60 percent internal fuel) . (lb) ...	12,882	13,143	14,396	....
Engine power Military	Military	Military	Military	....
Fuel (lb) ...	1158	1158	1158	....
Combat speed/combat altitude ^{2/} (kn/ft) ...	250/5000	248/5000	238/5000	....
Rate of climb/combat altitude ^{2/} (fpm/ft) ...	2660/5000	2560/5000	2175/5000	....
Combat ceiling (500 fpm) ^{2/} (ft) ...	27,700	26,900	23,800	....
Rate of climb at SL ^{2/} (fpm) ...	3050	2940	2530	....
Max speed at SL ^{2/} (kn) ...	247.2	244.9	235.9	....
Max speed/altitude ^{2/} (kn/ft) ...	252/11,500	249.5/11,500	239.5/10,000	....
LANDING WEIGHT (10 percent internal fuel) (lb) ...	11,917	12,178	13,431	....
Fuel (lb) ...	193	193	193	....
Stall speed-power-off/approach power ^{5/} ... (kn) ...	67.5/54.6	68.2/55.2	71.5/58	....
Landing distance clear 50-ft obstacle ... (ft) ...	870	890	1330	....

1-70. Loading and Performance — Typical Mission, OV-1B (Mohawk) (CONT).

1/ Normal rated power.

2/ Military rated power.

3/ See notes on mission specifications.

4/ Flight idle power, propeller control at max rpm.

5/ Power for level flight at 120 percent of stall speed, power off, propeller control at max rpm.

1-71. Performance Notes, OV-1B (Mohawk).

TACTICAL AIR OBSERVATION MISSION AND NIGHT PHOTOGRAPHY (Columns 1, 3, and 5, paragraph 1-70).

Warm up, taxi, take off, climb on course to 5000 feet at normal rated power, and cruise at 200 knots at 5000 feet until all but reserve fuel is consumed. Range-free allowances are 5 minutes at normal rated power for warmup, taxi, and take off, plus 10 percent of initial internal fuel for reserve.

FERRY MISSION (Column 7, paragraph 1-70).

Warm up, taxi, take off, climb on course to altitude for maximum range at normal rated power, cruise at altitude and velocity for maximum range until all but reserve fuel is consumed, and drop external fuel tanks when empty. Range-free allowances are 5 minutes at normal rated power for warmup, taxi, and take off, plus 10 percent of initial fuel for reserve.

1-72. OV-1C (Mohawk) Characteristics.

POWERPLANT				MISSION AND DESCRIPTION		WEIGHTS	
No. & model .....(2) T53-L-7/15 Mfr .....Lycoming Type .....Power free turbine Engine spec No ... 104.11C, .21-B and .35 Red. gear ratio 12.46 Prop mfr .....Ham std No. blades 3 Blade design No ... 7125-6 Prop dia 10 ft				Mfr's Model: Grumman The primary mission of the OV-1C is to perform Infrared (IR) reconnaissance missions using the Infrared sensor. In addition it is capable of performing photographic missions, visual reconnaissance and observation, artillery gunfire spotting, air control, and radiological monitoring. The OV-1C is a two-place, twin-turboprop aircraft capable of operating from small fields and unimproved runways. Design features include a midwing, three-tail configuration of semi-monocoque construction equipped with wide span flaps. The crew of two are seated side-by side within a bubbled enclosure at the extreme forward end of the fuselage. A remotely operated day-and night KA-30 or KA-76 camera installation provides horizon-to-horizon photo coverage along the aircraft flight path. A nose-mounted KA-60, 70-mm panoramic camera is also provided. The OV-1C carries AN/UAS-4 infrared detection equipment. The infrared surveillance system makes it possible to detect military terrestrial targets by inherent characteristics that are distinguishable in the visual and infrared portion of the electromagnetic spectrum. External provisions are incorporated to carry two 150-gallon fuel tanks or two resupply containers.		LB L.F. Empty 10,011 Basic 10,379 Design 11,924 4.9/4.0 Combat (basic mission) 12,296 Normal takeoff . 12,682 Max takeoff ... 15,302 Max landing ... 15,302	
ENGINE RATINGS						FUEL AND OIL	
T53-L-7 Rating/SL SHP SFC Output RPM Max (takeoff) 1100 0.670 1700 Mil 1000 0.679 1700 NRP 900 0.692 1700 T52-L-15 Rating/SL SHP SFC Output RPM Mil 1160* 0.620 1700 NRP 1000* 0.650 1600 *Mechanical limited.						Fuel: Grade JP-4 Spec MIL-T-5624 No. tanks: Fuselage (1) 297 gal External (2) 150 gal Total qty 597 gal Oil: Spec MIL-L-23699 Qty 5 gal	
				DEVELOPMENT		AVIONICS	
				First flight (prototype) March 1961 First service use July 1961		Refer to chapter 2.	
DIMENSIONS						ARMAMENT	
Wing: Area 330 sq ft Span 42 ft/48 ft MAC 98 in. Length 41 ft, 1-1/2 in. Height 12 ft, 8 in. Tread 9 ft, 2 in.						Refer to chapter 2.	

1-73. Loading and Performance — Typical Mission, OV-1C (Mohawk).

TAKEOFF LOADING CONDITION	OBSERVATION NO STORES 1	NIGHT PHOTO, TWO A6 EJECTORS 3	EMERGENCY RESUPPLY TWO RESUPPLY CONTAINERS 5	FERRY, TWO 150-GAL EXT TANKS 7
TAKEOFF WEIGHT (lb)...	12,682	12,943	14,197	14,961
Fuel (lb)...	1930	1930	1930	3880
Payload (lb)...	....	264	1500	....
Wing loading (lb/sq ft)...	38.4	39.2	43.0	45.3
Stall speed (power-off) ^{4/} (kn)...	74	74	78	80
Takeoff run at SL — calm ^{6/} (ft)...	990	1040	1270	1440
Takeoff run at SL — 25-kn wind ^{6/} (ft)...	613	640	802	930
Takeoff to clear 50 ft — calm ^{6/} (ft)...	1640	1680	2000	2230
Max speed/altitude ^{1/} (kn/ft)...	246/10,000	243/10,000	229/5000	230/SL
Rate of climb at SL ^{1/} (fpm)...	2270	2175	1800	1630
Time: SL to 20,000 ft ^{1/} , ^{2/} (min)...	14/12	15/13	22/17	27/22
Time: SL to 25,000 ft ^{1/} , ^{2/} (min)...	24/20	27/22	47/35	64/47
Service ceiling (100 fpm) ^{1/} , ^{2/} (ft)...	26,200/27,450	25,700/26,500	21,600/23,200	20,200/21,300
COMBAT RANGE ^{3/} (nmi)...	408	397	362	1081
Average cruising speed (kn)...	200	200	200	215
Cruising altitude(s) (ft)...	5000	5000	5000	20,000
Cruise time (hr)...	2.01	1.96	1.78	4.72
Mission time (hr)...	2.05	2.00	1.83	5.17
COMBAT LOADING CONDITION	NO STORES 2	TWO A6 EJECTORS 4	TWO RESUPPLY CONTAINERS 6	
COMBAT WEIGHT (60 percent internal fuel) (lb)...	11,910	12,171	13,425	....
Engine power Military	Military	Military	Military	....
Fuel (lb)...	1158	1158	1158	....
Combat speed/combat altitude ^{2/} (kn/ft)...	256/5000	252/5000	240/5000	....
Rate of climb/combat altitude ^{2/} (fpm/ft)...	2100/5000	2000/5000	1620/5000	....
Combat ceiling (500 fpm) ^{2/} (ft)...	25,200	24,300	20,400	....
Rate of climb at SL ^{2/} (fpm)...	2880	2780	2320	....
Max speed at SL ^{2/} (kn)...	255	252	239	....
Max speed/altitude ^{2/} (kn/ft)...	256/10,000	253/10,000	240/5000	....
LANDING WEIGHT (10 percent internal fuel) (lb)...	10,945	11,206	12,460	....
Fuel (lb)...	193	193	193	....
Stall speed-power off ^{4/} /approach power ^{5/} (kn)...	68/54	69/55	72/58	....
Landing distance to clear 50-ft obstacle (ft)...	850 ^{7/}	870 ^{7/}	1335 ^{8/}	....

1-73. Loading and Performance – Typical Mission, OV-1C (Mohawk) CONT).

¹/Normal rated power.

²/Military rated power.

³/See notes on mission specifications.

⁴/Flight idle power, propeller control at max rpm.

⁵/Power for level flight at 120 percent of stall speed, power off, propeller control at max rpm.

⁶/Takeoff distances are based on takeoff and obstacle speed equal to 120 percent of power-off stall speed in takeoff configuration.

⁷/Landing distance is based on approach speed equal to 110 percent of landing stall speed with rate of sink equal to 14 fps.

⁸/Landing distance is based on approach speed equal to 110 percent of landing stall speed, power off, with rate of sink equal to 8 fps.

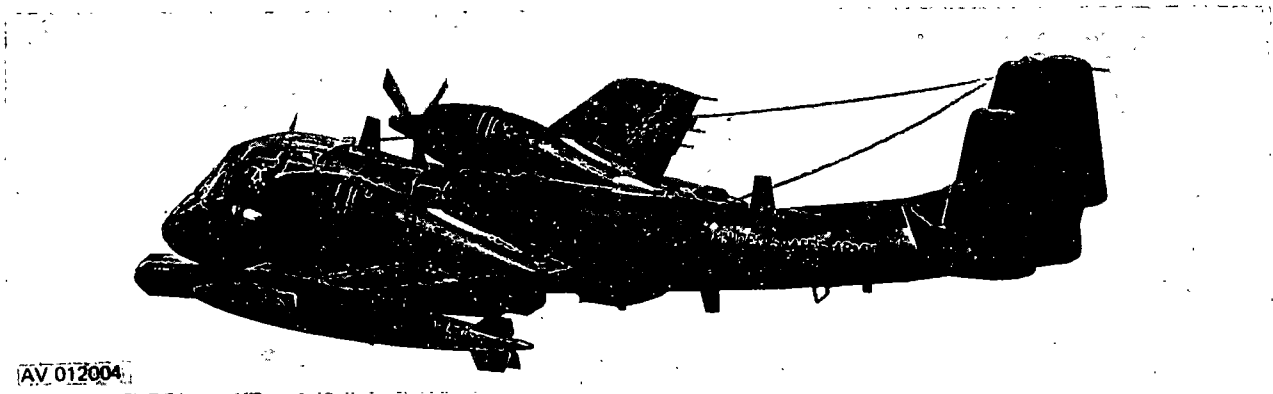
1-74. Performance Notes, OV-1C (Mohawk).

TACTICAL AIR OBSERVATION MISSION AND NIGHT PHOTOGRAPHY (Columns 1, 3, and 5, paragraph 1-73).

Warm up, taxi, take off, climb on course to 5000 feet at normal rated power, and cruise at 200 knots at 5000 feet until all but reserve fuel is consumed. Range-free allowances are 5 minutes for warmup taxi and takeoff, plus 10 percent of initial internal fuel for reserve.

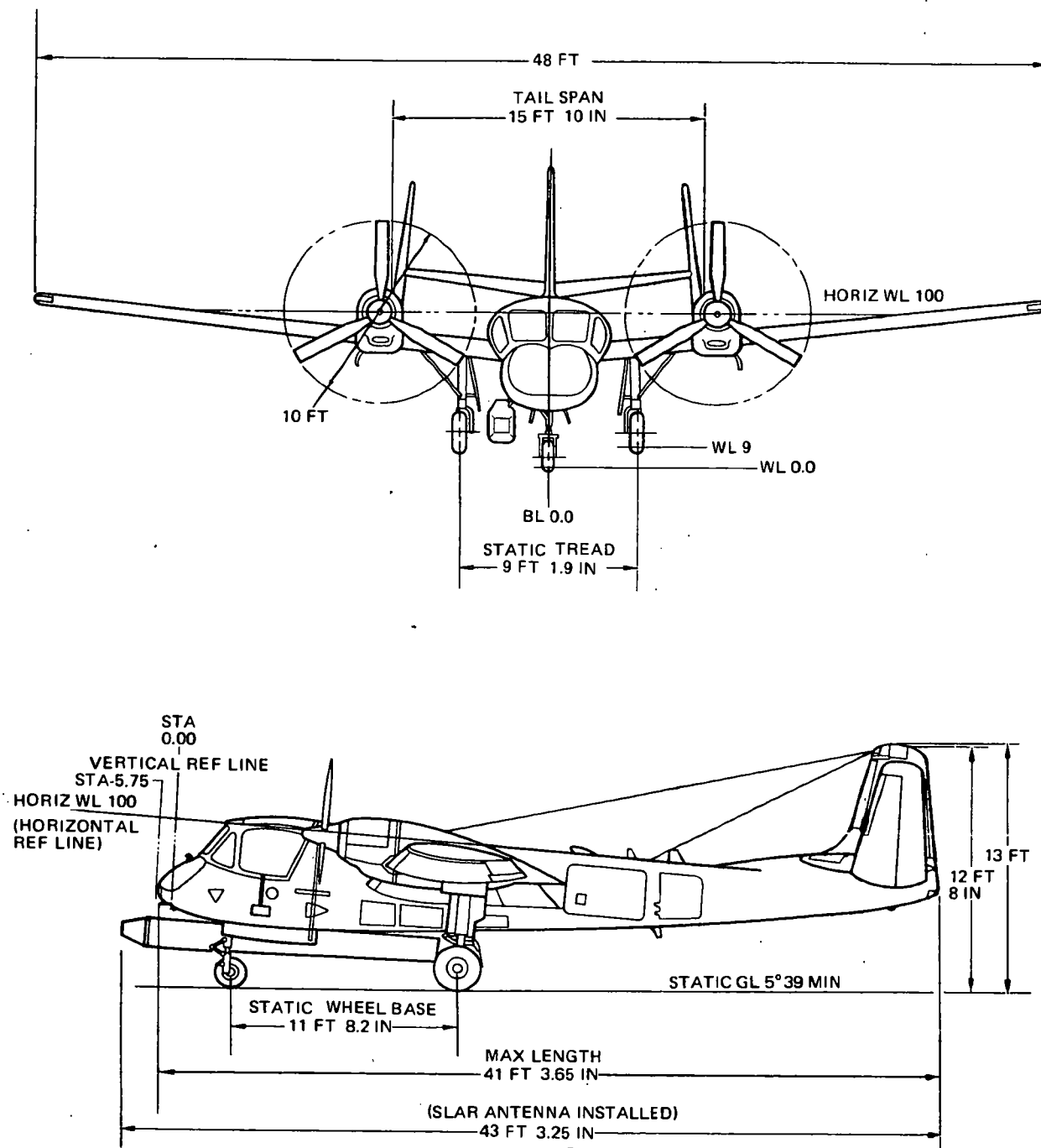
FERRY MISSION (Column 7, paragraph 1-73).

Warm up, taxi, take off, climb on course to altitude for maximum range at normal rated power, cruise at altitude and velocity for maximum range, and drop external fuel tanks when empty. Range-free allowances are 5 minutes for warmup, taxi, and take-off, plus 10 percent of initial internal fuel for reserve.



AV 012004

Figure 1-40. OV-1D (Mohawk)



AV 012005

Figure 1-41. Principal dimensions, OV-10 (Mohawk Type)

1-75. OV-1D (Mohawk) Characteristics.

1-75. OV-1D (Mohawk) Characteristics.			
POWERPLANT			
No. & model (2) T53-L-701			
Mfr Lycoming			
Type Free power Turbine			
Engine spec No 104.39			
Red. gear ratio 12.38			
Prop mfr Ham std			
Blade design No 5157C-6			
No of blades 3			
Prop dia 10 ft			
MISSION AND DESCRIPTION			
The primary mission of the OV-1D is to perform either infrared (IR) reconnaissance or side looking airborne radar (SLAR) missions. The SLAR and IR are interchangeable. In addition, it is capable of performing photographic missions, visual reconnaissance and observation, artillery gunfire spotting, air control, and radiological monitoring. The OV-1D is a two-place, twin turboprop aircraft capable of operating from small fields and unimproved runways. Design features include a midwing, three-tail configuration of semimonocoque construction equipped with wide span flaps.			
The crew of two are seated side-by-side within a bubbled enclosure at the extreme forward end of the fuselage.			
The OV-1D is equipped with three independent photographic systems, all of which have automatic exposure controls and can be operated by either the pilot or observer.			
External provisions are incorporated to carry two 150-gallon fuel tanks, two ECM pods, or LS 59A photo flasher.			
ENGINE RATINGS			
T53L-701	Output		
Rating/SL	SHF	SFC	RPM
MIL	1400	.590	1650
NRP	1250	.610	1590
DEVELOPMENT			
First flight-(prototype) Sept 68			
First service use July 70			
WEIGHTS			
Refer to Loading and Performance Chart.			
FUEL & OIL			
Fuel			
Grade JP-4/5			
Spec MIL-T-5624			
No. tanks			
Fuselage (1) 297 gal			
External (2) 150 gal			
Total qty 597 gal			
Oil:			
Spec MIL-L-23699			
Qty 5 gallon			
AVIONICS			
Refer to Chapter 2.			
DIMENSIONS			
Wing:			
Area 360 sq ft			
Span 48 ft			
MAC 98 in.			
Length 41 ft,			
3.65 in.			
Height 12 ft, 8 in.			
Tread 9 ft, 2 in.			

1-76. Loading and Performance – Typical Mission, OV-1D (Mohawk).

TAKEOFF LOADING CONDITION		OBS- SURV WITH SLAR AN/ALQ-67, AN/ALQ-80, NO EXT FUEL TANKS	NIGHT PHOTO WITH SLAR AN/ALQ-67, AN/ALQ-80, NO EXT FUEL TANKS	MAX GROSS WT WITH SLAR AN/ALQ- 67, AN/ALQ-80, LS-59A FLASHER, EXT FUEL TANKS	OBS-SURV WITH IR AN/ALQ-67, AN/ALQ-80, NO EXT FUEL TANKS	NIGHT PHOTO WITH IR, AN/ALQ-67, AN/ALQ-80, LS-59A FLASHER, NO EXT FUEL TANKS	MAX GROSS WT WITH IR, AN/AAS-24, AN/ALQ-80, LS-59A FLASHER, AND EXT FUEL TANKS
TAKEOFF WEIGHT (lb) . . .		15,534	15,688	18,224	15,387	15,541	18,077
Weight Empty (lb) . . .		11,737	11,737	11,737	11,737	11,737	11,737
Payload (useful) ^{2/} (lb) . . .		3,791	3,951	6,487	3,650	3,804	6,340
Fuel (internal) (lb) . . .		1,930	1,930	3,880	1,930	1,930	3,880
Stall speed (power off) ^{4/} (kn) . . .		80	81	89	79	80	88
Takeoff run at SL – calm ^{5/} (ft) . . .		1,160	1,200	2,275	1,150	1,170	2,270
Takeoff run at SL – 25-kn head wind ^{5/} (ft) . . .		750	800	1,550	730	750	1,500
Takeoff to clear 50 ft – calm ^{5/} (ft) . . .		1,735	1,757	2,037	1,700	1,735	2,015
Max speed/altitude ^{1/} (kn/ft) .		215/5000	216/5000	213/5000	228/5000	230/5000	224/5000
Rate of climb at SL ^{1/} (fpm) . .		2,325	2,300	1,700	2,475	2,450	1,900
Time: SL to 20,000 ft ^{1/ 2/} (min) . .		14.5/11.4	15/11.7	20.4/15.7	12.8/10.5	13/10.5	20.5/14.8
Time: SL to 25,000 ft ^{1/ 2/} (min) . .		25/18	26/18.5	---/34.3	12.8/10.3	13/10.5	---/25.5
Service ceiling (100 fpm) ^{1/ 2/} (ft) . . .		25000/25000	25000/25000	25000/25000	25000/25000	25000/25000	25000/25000
COMBAT RANGE ^{3/} (nmi) . .		323	325	615	344	346	660
Average cruising speed (kn) . . .		178	178	178	182	182	182
Cruising altitude(s) (ft) . . .		5000	5000	5000	5000	5000	5000
Cruise time ^{3/} (hr) . . .		1.7	1.8	3.4	1.7	1.8	3.6
COMBAT LOADING CONDITION							
COMBAT WEIGHT (60% Internal Fuel) (lb) . . .		14,762	14,916	17,452	14,615	14,769	17,305
Engine power (prop rpm, eng torque press) (lb) . . .		1720/122	1720/122	1720/122	1720/122	1720/122	1720/122
Fuel (lb) . . .		1158	1158	3108	1158	1158	3108
Rate of climb/combat altitude (fpm/ft)		1800/5000	1750/5000	1250/5000	1800/5000	1750/5000	1400/5000
Combat ceiling (500 fpm) (ft) . . .		25,000	25,000	25,000	25,000	25,000	25,000
LANDING WEIGHT (10% internal fuel) (lb) . . .		13,797	13,951	14,537	13,648	13,804	14,390
Fuel (lb) . . .		193	193	193	193	193	193
Stall speed-power-off ^{4/} approach power ^{5/} (kn) . . .		72.4/90.5	72.4/90.5	78.4/98	72.4/90.5	72.4/90.5	78.4/98
Landing distance to clear 50 ft obstacle (ft) . . .		2550 ^{2/}	2550 ^{2/}	3100 ^{3/}	2550 ^{2/}	2550 ^{2/}	3000 ^{3/}

1-76. Loading and Performance – Typical Mission, OV-1D (Mohawk) (CONT).

- 1/ Normal rated power.
- 2/ Military rated power.
- 3/ See Mission Type. Sample is based on:
 - a. 5000 ft altitude.
 - b. Standard day.
 - c. 180 knots CAS.
 - d. All stores installed.
 - e. Full external fuel, if installed.
 - f. Total fuel consumption; with 10% reserve remaining.
 - g. A total mission distance, from point of origin and return.
- 4/ Flight idle power, 0° -Bank, prop RPM maximum.
- 5/ Power for level flight at 120 per cent of stall speed, power-off, prop control at maximum RPM.
- 6/ Takeoff distances are based on takeoff and obstacle speed equal to 120 per cent of power-off stall speed in takeoff configuration.
- 7/ Landing distance based on a ground and air distance total at sea level approach speed equal to 120 per cent of landing stall speed or a CAS of 90.5 knots, ambient temp of 20°C, 0 knot head wind and 12.2 FPS rate of sink.
- 8/ Landing distance based on a ground and air distance total, at sea level approach speed equal to 120 per cent of landing stall speed or a CAS of 98 knots, ambient temp of 20°C, 0 knot head wind and 12.2 FPS rate of sink.
- 9/ Fuel and mission essential equipment.

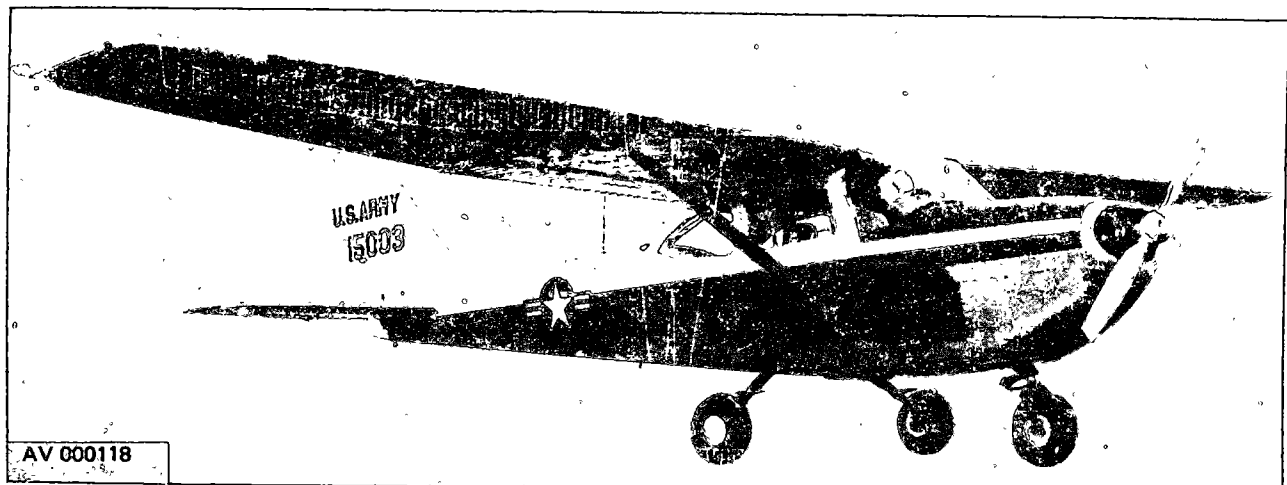
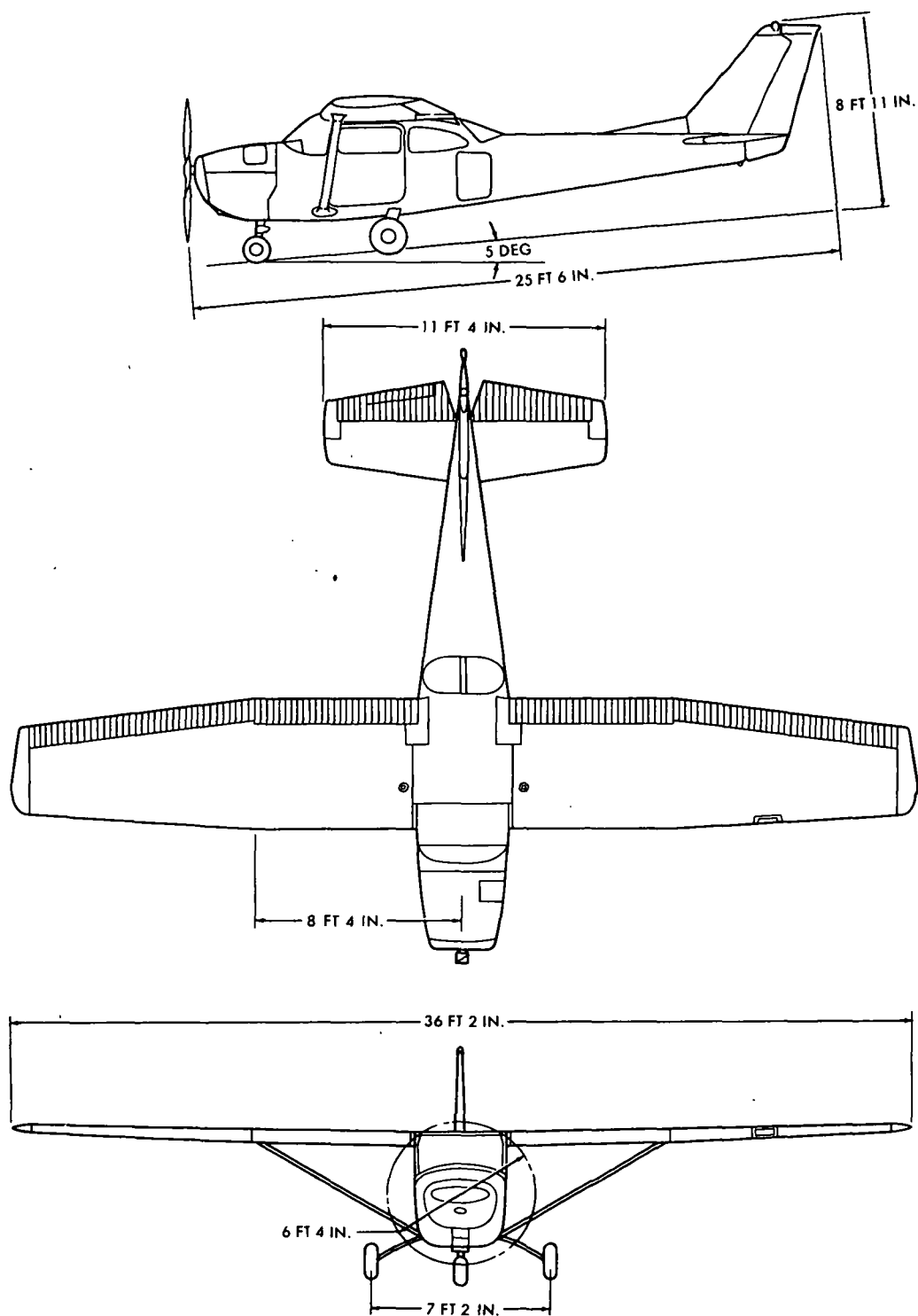


Figure 1-42. T-41B (Mescalero)



AV 000119

Figure 1-43. Principal dimensions, T-41B (Mescalero)

1-77. T-41B (Mescalero) Characteristics.

POWERPLANT			MISSION AND DESCRIPTION		WEIGHTS	
No. & model (1) IO-360D Mfr. Continental Prop type CS, VP Prop dia 6 ft, 4 in.			Mfr's Model: Cessna 172 The T-41B is an interim inventory fill to replace O-1 drawdown pending availability of the OH-6A. Missions include primary and advanced contact trainer and installation support roles. The T-41B will be used in two configurations as follows: Utility mission – FAA normal category to include aircraft empty weight, including electronics, crew of two (instructor and student), at 200 pounds each, and fuel for endurance for 4.5 hours at 110 knots. Normal mission – FAA normal category to include aircraft empty weight, including electronics, crew of one, two passengers, at 200 pounds each, and fuel for endurance for 4.5 hours at 110 knots.		LB Empty 1545 Utility 2200 Normal 2500	
ENGINE RATING					FUEL AND OIL	
	BHP	RPM			Fuel: Grade 115/145 Spec MIL-G-5572 Qty 52 gal Oil: Spec Temps above +40°F MHS-24A (SAE 50) Temps below +40°F MHS-24A (SAE 30)	
Takeoff	210	2800				
Normal	210	2800				
DIMENSIONS			DEVELOPMENT			
Wing span 36 ft, 2 in.			Date of contract 8 August 1966 First Production acft October 1966			
Height 8 ft, 11 in.					AVIONICS	
Tread 7 ft, 2 in.			FEATURES	PERSONNEL	Refer to chapter 2.	
			All metal. High wing. Fixed tricycle landing gear. Dual side-by-side controls.	Crew 2 Instructor pilot 1 Student pilot 1 or Crew 1 Passengers 2	ARMAMENT	
						None

1-78. Performance — Typical Mission, T-41B (Mescalero).

Range (4.5 hours) (mi) . . .	590
Cruise speed $\frac{1}{2}$ (mph) . . .	148
Max speed (mph) . . .	153
Takeoff distance (ft) . . .	635
Landing distance (ft) . . .	400
Rate of climb (fpm) . . .	910
Service ceiling (ft) . . .	17,500
$\frac{1}{2}$ /75 percent power at 5500 feet.	

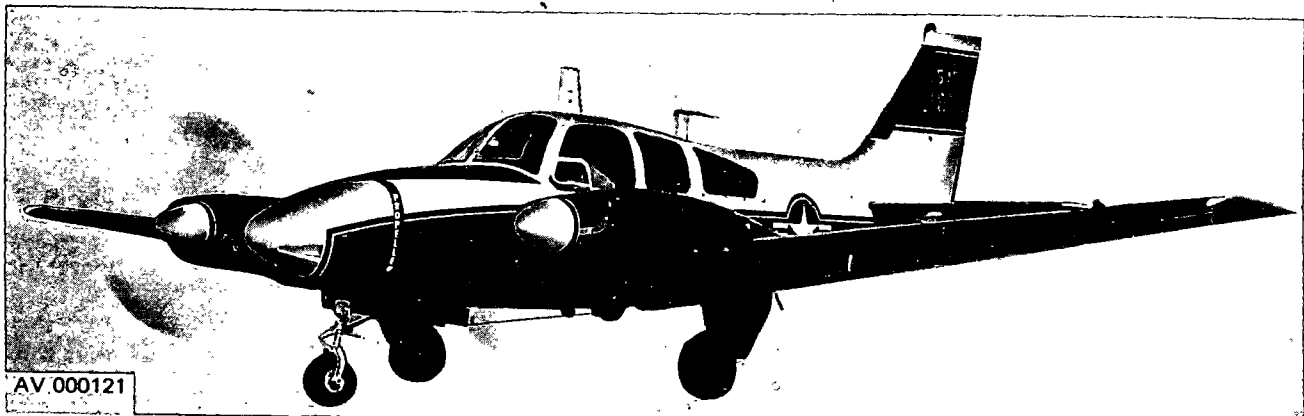
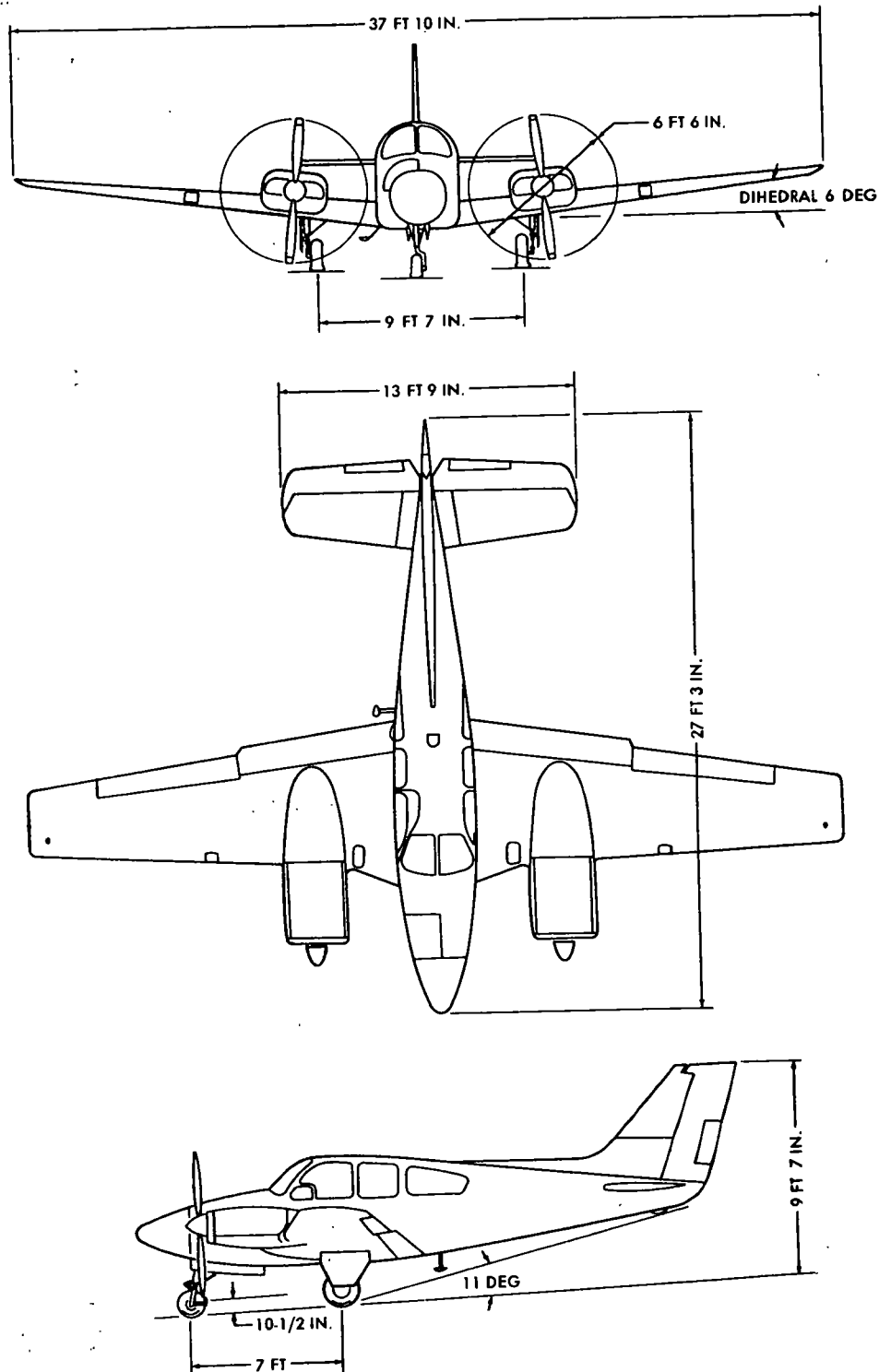


Figure 1-44. T-42A (Cochise)



AV 000122

Figure 1-45. Principal dimensions, T-42A (Cochise)

1-79. T-42A (Cochise) Characteristics.

POWERPLANT		MISSION AND DESCRIPTION		WEIGHTS	
No. & model (2) IO-470-L Mfr Continental Engine spec No .. 1634-B Prop mfr McCauley Blade design No .. 78FF-0 Prop type Hyd, CS, FF Prop dia 6 ft, 6 in. No. blades 2		Mfr's Model: Beech 95-B55B The primary mission of the T-42A is the training of military pilots in instrument flying, in both day and night Instrument Flight Rule operations. The secondary mission of the T-42A is twin-engine transition training of single engine rated pilots. The T-42A is an all-metal, twin-engine, four place low wing monoplane, with retractable landing gear. The cabin is designed to accommodate an instructor pilot and three student pilots. The instructor and primary student sit side by side; the two additional students sit immediately behind. The instructor and primary student each have a complete set of flight controls and instruments. The seating arrangement permits inflight movements of students from the forward primary seat to the rear seats. Emergency evacuation is accomplished by quick-release jettison of windows on both sides of the windshield. The warm air system is utilized for anti-icing, defrosting, and defogging of windshield.		LB L.F. Empty 3423 Basic 3480 Design 5100 +4.4, -3.0 Max takeoff 5100 do Max 5100 do	
ENGINE RATINGS				FUEL AND OIL	
BHP RPM ALT MIN Takeoff 260 2625 SL Cont. Normal 260 2625 SL Cont.				Fuel: Grade 115/145 Spec MIL-G-5572 No. tanks 4 Location Wing Qty 136 gal Oil: Spec Temps above +40°F MHS-24A (SAE 50) Temps below +40°F MHS-24A (SAE 30) Location Engines Qty 6 gal	
DIMENSIONS				DEVELOPMENT	
Wing: Span 37 ft, 10 in. Incidence (root). 4 deg (tip) -1 deg Dihedral 6 deg Sweepback 0.0 deg Length 27 ft, 3 in. Height 9 ft, 7 in. Tread 9 ft, 7 in. Prop and clearance 10-1/2 in.		Date of contract February 1965 First flight July 1965 First acceptance August 1965 Production completed June 1966			
		FEATURES	PERSONNEL	AVIONICS	
		Cabin air conditioning, heating, and ventilation. Cabin soundproofing. Oxygen system. Dual controls and instruments. Steerable nose wheel. Fuel injection. Propeller anti-icing and wing and stabilizer deicing. Rotating beacon. Three-axis trim.	Crew 4 Instructor pilot 1 Student pilot 3 or Crew 1 Passengers 3	Refer to chapter 2.	
				ARMAMENT	
				None	

1-80. Loading and Performance – Typical Mission, T-42A (Cochise).

TAKEOFF LOADING CONDITIONS			BASIC MISSION
Takeoff weight	(lb)		5,100
Fuel	(lb)		816
Payload	(lb)		—
Wing loading	(lbs/sq ft)		25.5
Stall speed ^{1/}	(kn)		68
Stall speed ^{2/}	(kn)		76.5
Takeoff run at SL	(ft)		910
Takeoff run to clear 50 ft	(ft)		1,255
Max speed SL	(kn)		205
Rate climb SL	(fpm)		1,670
Time SL to 10,000 ft	(min)		8
Service ceiling (100 FPM)	(ft)		19,700
LANDING WEIGHT			
	(10% Fuel)		4,333
Fuel	(lb)		85
Ground roll at SL	(ft)		805
Landing distance to clear 50 ft obstacle	(ft)		1,580

^{1/} Zero thrust, flaps 28°, and gear down^{2/} Power OFF, flaps up, and gear up



CHAPTER 2

LOGISTICS AND MATERIEL

Section I. MAXIMUM ALLOWABLE OPERATING TIME (MAOT) (MAJOR COMPONENTS)

2-1. Major Components.

TYPE OF AIRCRAFT	MAJOR COMPONENT	MAOT	LIFE EXPECTANCY
AH-1G	Engine (T53-L-13B)	1800	Indefinite
	Main rotor blade assembly	1100	1100
	Main rotor hub assembly	1100	Indefinite
	Yoke	3300	3300
	Extension assembly	3300	3300
	Retention straps	2200	2200
	Pin	2200	2200
	Fitting	2200	2200
	Nut	2200	2200
	Pitch horn	6600	6600
	Transmission assembly: P/N 204-040-016-5	1500	Indefinite
	Main input quill assembly	1500	Indefinite
	Mast assembly	1100	Indefinite
	Mast bearing	1100	1100
	Blade assembly, tail rotor	1100	1100
	Tail rotor hub assembly	1100	1100
	Grip	1100	1100
	Yoke	1100	1100
	42-degree gearbox	1500	Indefinite

2-1. Major Components (CONT).

TYPE OF AIRCRAFT	MAJOR COMPONENT	MAOT	LIFE EXPECTANCY
AH-1G (Cont) . . .	90-degree gearbox	1100	Indefinite
	Swashplate and support Assembly	1100	Indefinite
	Outer ring	3300	3300
	Inner ring	3300	3300
	Scissors and sleeve assembly	1100	Indefinite
	Scissors assembly	3300	3300
	Drive link:		
	P/N 209-010-408-1	400	400
	P/N 209-010-408-5	25	25
	Engine mount trunnion:	300	300
	P/N 206-060-113-1		
	Servo cylinder assembly	3300	Indefinite
	Cylinder	3300	3300
	Bearing housing	3300	3300
	Pitch link assembly P/N 209-010-411-1	6600	6600
CH-47A	Engine (T55-L-7)	1800	Indefinite
	Forward rotor head	2400	Indefinite
	Aft rotor head	2400	Indefinite
	Forward transmission	1200 <u>1/</u>	Indefinite
	Aft transmission	1200 <u>1/</u>	Indefinite
	Combining transmission	1200 <u>1/</u>	Indefinite
	Engine transmission	1200 <u>1/</u>	Indefinite
	Rotor blades, forward	3600	3600

2-1. Major Components (CONT).

TYPE OF AIRCRAFT	MAJOR COMPONENT	MAOT	LIFE EXPECTANCY
CH-47A (Cont) . .	Rotor blades, aft	2400	2400
CH-47B	Engine (T55-L-7C)	1800	Indefinite
	Forward rotor head	1200	Indefinite
	Aft rotor head	1200	Indefinite
	Forward transmission	1200 <u>1</u> /	Indefinite
	Aft transmission	1200 <u>1</u> /	Indefinite
	Combining transmission	1200 <u>1</u> /	Indefinite
	Engine transmission	1200 <u>1</u> /	Indefinite
	Rotor blades, forward	6000 <u>1</u> /	6000 <u>1</u> /
	Rotor blades, aft	4000 <u>1</u> /	4000 <u>1</u> /
CH-47C	Engine (T55-L-11A)	1200	Indefinite
	Forward rotor head	1200	Indefinite
	Aft rotor head	1200	Indefinite
	Forward transmission	1200 <u>1</u> /	Indefinite
	Aft transmission	1200 <u>1</u> /	Indefinite
	Combining transmission	1200 <u>1</u> /	Indefinite
	Engine transmission	1200 <u>1</u> /	Indefinite
	Rotor blades, forward	6000 <u>1</u> /	6000 <u>1</u> /
	Rotor blades, aft	4000 <u>1</u> /	4000 <u>1</u> /
CH-54A	Engine (T73-P-1)	1000	Indefinite
	Main rotor head	500	Indefinite
	Tail rotor head	800	Indefinite
	Main gearbox	1000	Indefinite
	Intermediate gearbox	On cond	Indefinite

2-1. Major Components (CONT).

TYPE OF AIRCRAFT	MAJOR COMPONENT	MAOT	LIFE EXPECTANCY
CH-54A (Cont) . .	Main rotor servo and control arm assembly	1000	Indefinite
	AFCS servo	1000	Indefinite
	APP clutch	On cond	Indefinite
	Main blades	5000	5000
	Tail rotor gearbox and servo assembly	1200	Indefinite
	Fuel control (T73-P-1)	1000	Indefinite
	Auxiliary power unit	On cond	Indefinite
CH-54B	Engine (T73-P-700)	800	Indefinite
	Main rotor head	800	Indefinite
	Main rotor servo	1200	Indefinite
	AFCS servo	1200	Indefinite
	Tail rotor head	800	Indefinite
	Tail rotor gearbox and servo assembly	1200	Indefinite
	Intermediate gearbox	1200	Indefinite
	Main gearbox	1000	Indefinite
	Main rotor damper	800	800
	Main rotor blade	2500	2500
	Tail rotor blade	1600	1600
	Main cargo hoist	240	Indefinite
OH-6A	Engine (T63-A-5A)	750	Indefinite
	Fuel control	750	Indefinite
	N ₂ governor	750	Indefinite
	Main transmission	750	Indefinite
	Main rotor swashplate bearing	1200	Indefinite

2-1. Major Components (CONT).

TYPE OF AIRCRAFT	MAJOR COMPONENT	MAOT	LIFE EXPECTANCY
OH-6A (Cont) . .	Main rotor hub	1200	5714
	Tail rotor transmission	750	Indefinite
	Tail rotor assembly	600	Indefinite
	Overrunning clutch	1200	Indefinite
	Main rotor blades	NA	1655
	Main rotor drive shaft	NA	1990
OH-13S/T	Engine (O-435-25A)	1200	Indefinite
OH-13 (all)	Main transmission	On cond	Indefinite
	Tail rotor gearbox	On cond	Indefinite
OH-58A	Engine (T63-A-700)	750	Indefinite
	Main transmission	1200	Indefinite
	Swashplate and support assembly	1200	Indefinite
	Main rotor swashplate bearing	NA	1200
	Main rotor hub	1200	Indefinite
	Grip	NA	4800
	Strap assembly	NA	1200
	Pin, strap retaining	NA	1200
	Fitting assembly	NA	1200
	Main rotor blades	NA	1200
	Mast assembly	1200	Indefinite
	Mast	NA	1200
	Tail rotor transmission	1200	Indefinite
	Tail rotor hub	1200	Indefinite
	Blade assembly	NA	1200
	Trunnion assembly	NA	2400

2-1. Major Components (CONT).

TYPE OF AIRCRAFT	MAJOR COMPONENT	MAOT	LIFE EXPECTANCY
OH-58A (Cont) . .	Freewheeling assembly	1200	Indefinite
	Drive shaft assembly, main	1200	Indefinite
	Pylon isolation mount	NA	1200
	Tail rotor drive shaft installation	1200	Indefinite
TH-55A	Tail rotor retention straps	2800	2800
	Main rotor blades	1366	1366
	Horiz stabilizer assembly	3070	3070
	Tail rotor drive shaft	3000	3000
	Tail rotor drive shaft driven spline	3000	3000
	Tail rotor gearbox input shaft	3000	3000
	Main rotor gearbox pinion assembly	3000	3000
	Lower pulley coupling shaft	1500	1500
	Tail boom assembly	17,370	17,370
	Engine (HIO-360-B1A)	1600	Indefinite
	Tail rotor gearbox	1800	Indefinite
UH-1B	Engine (T53-L-9A/11/11B)	1200	Indefinite
	Engine (T53-L-11C,D)	1550	Indefinite
	Main rotor hub	1100	Indefinite
	Main transmission	1100	Indefinite
	90-degree gearbox	1100	Indefinite
	42-degree gearbox	1500	Indefinite
	Main rotor blades	1000	1000

2-1. Major Components (CONT).

TYPE OF AIRCRAFT	MAJOR COMPONENT	MAOT	LIFE EXPECTANCY
UH-1B (Cont) . .	Main rotor mast	1100	Indefinite
	Tail rotor blades and hub	1100	1100
UH-1C/M	Engine (T53-L-9A/11/11B)	1200	Indefinite
	Engine (T53-L-11C,D)	1550	Indefinite
	Main rotor hub	1100	Indefinite
	Main transmission	1100	Indefinite
	Main rotor mast	1100	Indefinite
	Main rotor blades	1100	1100
	42-degree gearbox	1500	Indefinite
	90-degree gearbox	1100	Indefinite
	Cylinder	3300	3300
	Swashplate and support	1100	Indefinite
	Bearing housing	3300	3300
	Scissors and sleeve assembly	1100	Indefinite
	Servo cylinder assembly	3300	Indefinite
	Stabilizer bar	2200	2200
UH-1D	Engine (T53-L-9A/11 only)	1200	Indefinite
	Engine (T53-L-5/11B)	1200	Indefinite
	Engine (T53-L-11C,D)	1550	Indefinite
UH-1H	Engine (T53-L-13 only)	600	Indefinite
	Engine (T53-L-13A)	1200	Indefinite
	Engine (T53-L-13B)	1800	Indefinite
	Main rotor hub	1100	Indefinite
	Main transmission	1100	Indefinite

2-1. Major Components (CONT).

TYPE OF AIRCRAFT	MAJOR COMPONENT	MAOT	LIFE EXPECTANCY
UH-1H (Cont) . .	Main rotor mast	1100	Indefinite
	42-degree gearbox	1500	Indefinite
	90-degree gearbox	1100	Indefinite
	Main rotor blades: 48 foot	2500	2500
	Tail rotor blades and hub	1100	1100
O-1G	Engine (0-470-11A/11B)	1800	Indefinite
OV-1A/B/C/D . .	Engine (T53-L-7)	1200	Indefinite
	(T53-L-7A)	1800	Indefinite
	(T53-L-15)	1200	Indefinite
	(T53-L-701)	1200	Indefinite
	Propeller	1200	Indefinite
	Propeller control	1200	Indefinite
U-8D/G	Engine (0-480-1A/1B)	2000	Indefinite
	Propeller	2000	Indefinite
U-8F	Engine (0-480-3A)	2000	Indefinite
	Propeller	2000	Indefinite
U-21A	Engine (T74-CP-700)	2400 ^{3/}	Indefinite
RU-21A	Propeller: P/N HCB3TN3BT10173E8	2400	Indefinite
RU-21D			
U-21G			
RU-21E			
RU-21B	Engine (T74-CP-702)	2400	Indefinite
	Propeller: P/N HCB3TN3BT10173EB	2400	Indefinite

2-1. Major Components (CONT).

TYPE OF AIRCRAFT	MAJOR COMPONENT	MAOT	LIFE EXPECTANCY
U-21F	Engine (PT6A)	1800	Indefinite
	Propeller:	1800	Indefinite
	P/N HCB4TN3T10173FB12½		

NOTE: MAOT (Maximum allowable operating time) is the maximum operating time, interval, or usage increment limit at which it is mandatory that a component be removed from a service aircraft. (When used in reference to overhaul components, MAOT is the same as the term "time between overhaul" (TBO) previously used.)

NOTE: MTR (meantime to removal) is the average serviceable life of an item. The MTR is substantially less than the MAOT and varies under different operating conditions (i.e., erosion of engine turbine blades due to ingestion of dust in RVN). Refer to AVSCOM, ATTN: AMSAV-EE for MTR data.

NOTE: This manual is a general guide. Check should be made with the most current publication for the specific MAOT.

1/ Component MAOT varies according to part numbers. MAOT shown is for part with the highest value.

2/ Component MAOT and/or life expectancy varies with different part numbers. Life shown is for the part with the highest value.

3/ TB 55-1510-209-20/2 goal is 3000 hours.

Source: AVSCOM(AMSAV-EE)

Section II. AIRCRAFT EQUIPMENT

2-2. Avionics and Surveillance Equipment Configurations.*

The following avionics and surveillance configurations are typical and may vary depending on

production run, changes incorporated through MWO action, and theater of operation in which the aircraft is employed. For further details on Army Aircraft configuration, including retrofit objectives, refer to AR 95-71 U. S. Army Avionics.

*Source: ECOM (AMSEL-SI-AE)

AH-1G		AH-1G						
TYPE NUMBER	FUNCTION/NOUN							
AM-3209()/ASN	Servo Amplifier	1						
AN/APX-72	IFF Transponder	1						
AN/ARC-51BX	UHF-AM Radio Set	1						
AN/ARC-54/131	VHF-FM Radio Set	¹ /1						
AN/ARC-114	VHF-FM Radio Set #2	² /CPO						
AN/ARC-134	VHF-AM Radio Set	1						
AN/ARN-83	ADF Receiver	1						
AN/ASN-43	Gyro Compass	1						
AS-2285()/ARC	VHF-FM Comm Ant	1						
AT-884()/APX	IFF Antenna	1						
BB433/A/BB-649/A	Battery	¹ /1						
C-1611()/AIC	Intercom Set	2						
C-8157()/ARC	Control-Ind Ass'y	1						
CN-1314()/A	Gyroscope	1						
ID-48()/ARN	Course Indicator	1						
ID-250()/ARN	Course Indicator	1						
ID-998()/ASN	RMI Indicator	1						
KIT-1A/TSEC	IFF Computer	CPO						

2-2. Avionics and Surveillance Equipment Configurations (CONT).

AH-1G		AH-1G						
TYPE NUMBER	FUNCTION/NOUN							
MC-1	Rate Switch Gyro	1						
MD-736()/A	Signal Discriminator	2						
MT-3802()/ARC	Mount (KY-28)	1						
PP-6508()/U	Static Inverter	1						
PU-543()/A	Inverter	1						
TS-1843()/APX	IFF Test Set	CPO						
TSEC/KY-28	Comm Security Set	CPO						
BHC PN 209-030-133-3	ADF Sense Antenna	1						
BHC PN 209-075-292-1	FM Homing Antenna	1						
BHC MODEL 570A	Stabilizer and Control Augmentation System	1						

¹/Either the AN/ARC-54 or AN/ARC-131 may be installed, but not both. Either the BB-433/A or BB-649/A may be installed, but not both.

²/See AR 95-71 for production/retrofit objectives for installation of CPO for AN/ARC-114.

2-2. Avionics and Surveillance Equipment Configurations (CONT).

CH-47								
TYPE NUMBER	FUNCTION/NOUN	CH-47A (FY-61)	CH-47A (FY 62-63)	CH-47A (FY-64)	CH-47A (FY-65)	CH-47A (FY-66)	CH-47B (FY 66-67)	CH-47C (FY 67-71)
AM-3209()/ASN	Servo Amplifier	1	1	1	1	1	1	1
AN/APX-44/72	IFF Transponder	⁷ /1	⁷ /1	⁷ /1	⁷ /1	⁷ /1	⁷ /1	⁷ /1
AN/ARA-31	FM Antenna GP	1						
AN/ARC-44	VHF-FM Radio Set	1						
AN/ARC-51BX	UHF-AM Radio Set		1	1	1	1	1	1
AN/ARC-54/131	VHF-FM Radio Set		1	1	1	1	1	1
AN/ARC-55	UHF-AM Radio Set	1						
AN/ARC-73	VHF-AM Radio Set	CPO	CPO	CPO	CPO	CPO	CPO	CPO
AN/ARC-102	HF-AM Radio Set	CPO	CPO	CPO	CPO	CPO	CPO	CPO
AN/ARC-114	VHF-AM Radio Set #2			⁸ /CPO	⁸ /CPO	⁸ /CPO	⁸ /CPO	⁸ /CPO
AN/ARC-115/134	VHF-AM Radio Set			⁹ /1	⁹ /1	⁹ /1	⁹ /1	⁹ /1
AN/ARN-30E	VOR Receiver	1	1	1	1			
AN/ARN-59	ADF Receiver #1	1	1	1	1			
AN/ARN-59	ADF Receiver #2	CPO						
AN/ARN-82	VOR Receiver					1	1	1
AN/ARN-83	ADF Receiver					1	1	1
AN/ASH-19	Voice Warning	¹⁰ /1	¹⁰ /1	¹⁰ /1	¹⁰ /1	¹⁰ /1	¹⁰ /1	¹⁰ /1
AN/ASN-43	Gyro Compass				1	1	1	1
AN/ASN-72	Decca Nav Sys	CPO	CPO	CPO	CPO	CPO	CPO	CPO
AS-580()/ARN-30	VOR Antenna	1	1	1	1			
AS-1703()/AR	FM Comm Antenna		1	1	1	1	1	1
AS-1922()/ARC	FM Homing Antenna		1	1	1	1	1	1
AT-450()/ARC	UHF Comm Antenna	1						
AT-640()/ARN	Marker Beacon Ant	1	1	1	1	1	1	1
AT-884()/APX	IFF Antenna	1	1	1	1	1	1	1

2-2. Avionics and Surveillance Equipment Configurations (CONT).

CH-47		CH-47A (FY-61)	CH-47A (FY 62-63)	CH-47A (FY-64)	CH-47A (FY-65)	CH-47A (FY-66)	CH-47B (FY 66-67)	CH-47C (FY 67-71)
TYPE NUMBER	FUNCTION/NOUN							
AT-1108()/ARC	UHF-VHF Comm Ant		1	1	1	1	1	1
BB-432()/A	Battery	1	1	1	1	1	1	1
C-1611()/AIC	Intercom Set	6	6	6	6	6	6	6
C-4209()/ARC	Control (T-366()/ARC)	1	1					
C-8157()/ARC	Control Ind. Ass'y		1	1	1	1	1	1
CN-811()/ASN(SBU-6A)	Displacement Gyro	2	2	2	2	2	2	2
CU-942()/ARC	FM Antenna Coupler		1	1	1	1	1	1
CU-991()/ARC/CU-1658A	HF Antenna Coupler	CPO	CPO	CPO	CPO	CPO	CPO	² /CPO
CV-1275()/ARN	RMI Converter	1	1	1	1			
CVA-1224M	Switch	2	2	2	2	2	2	2
DMN 4-4.1	VOR Antenna					2	2	2
DY-86()/ARN-30 or	Dynamotor	1	1	1	1	1	1	1
PP-2792()/ARN-30D	Power Supply	1	1	1	1	1	1	1
F-726()/AR	Filter	1	1	1	1	1	1	1
ID-250()/ARN	Course Indicator	1	1	1	1	1	1	1
ID-453()/ARN-30	Course Indicator			1				
ID-998()/ASN	RMI Indicator	1	1	1	1	1	1	1
IN-14	Course Indicator	1	1					
J-2	Gyro Compass	1	1	1				
Kit-1A/TSEC	IFF Computer		CPO	CPO	CPO	CPO	CPO	CPO
M-40A	Mount (CV-1275()/ARN)	1	1	1	1			
MD-736()/A	Signal Discriminator		3	3	3	3	3	3
MT-1142()/ARC	Mount (T-366()/ARC)	1	1					
MT-1719()/AR/ MT-3772/A	Mount (CU-991()/ CU-1658/A	1	CPO	CPO	CPO	CPO	CPO	² /CPO

2-2. Avionics and Surveillance Equipment Configurations (CONT).

CH-47		CH-47A (FY-61)	CH-47A (FY 62-63)	CH-47A (FY-64)	CH-47A (FY-65)	CH-47A (FY-66)	CH-47B (FY 66-67)	CH-47C (FY 67-71)
TYPE NUMBER	FUNCTION/NOUN							
MT-2292()/ARN	Mount (R-1041()/ARN)	CPO	1	1	1	1	1	1
MT-2641()/ARC-94	Mount (AN/ARC-102)	1	1	1	1	1	1	³ /1
MT-3802()/ARC	Mount (KY-28)		1	1	1	1	1	1
R-1041()/ARN	Marker Beacon Receiver	⁶ /1	⁶ /1	⁶ /1	⁶ /1	⁶ /1	⁶ /1	⁶ /1
SI-07F	Filter	6	6	6	6	6	6	6
T-366()/ARC	VHF-AM Transmitter	1	1					
TSEC/KY-28	Comm Security Set		CPO	CPO	CPO	CPO	CPO	CPO
TS-1843()APX	IFF Test Set		CPO	CPO	CPO	CPO	CPO	CPO
114E 2186-16 or	Speed Trim Amplifier	⁴ /1	⁴ /1	⁴ /1				
114E 2186-19	Speed Trim Amplifier	⁴ /1	⁴ /1	⁴ /1	1	1		
114E 2186-23 or	Speed Trim Amplifier						1	
114E 2186-26	Speed Trim Amplifier						1	
114E 2186-30	Speed Trim Amplifier							1
114E 3030-40 or	SAS Amplifier	⁵ /2	⁵ /2					
114E 3030-42 or	SAS Amplifier	⁵ /2	⁵ /2	⁵ /2	⁵ /2	⁵ /2		
114E 3030-43	SAS Amplifier	⁵ /2	⁵ /2	⁵ /2	⁵ /2	2		
114E 3030-47	SAS Amplifier						2	⁶ /2
114E 3030-49	SAS Amplifier							2
114E 2082-6	Antenna					1		1
114E 3082-4	Antenna	1	1	1	1			

¹/Installation of complete provisions was discontinued after S/N 68-15814.

²/Provisions for CU-1658A/A and MT- 3772A/A were installed in production starting with S/N 68-15835. Prior aircraft have provisions for CU-991()/AR and MT-1719()/AR.

³/Installed in production, S/N 68-15860 and subsequent.

⁴/Vertol P/N 114E 2186-16 or 114E 2186-19 may be used; however, the former is the preferred item.

2-2. Avionics and Surveillance Equipment Configurations (CONT).

⁵/Vertol P/N 114E 3030-40 is only authorized when small landing gear is installed.

⁶/R-1041/ARN is installed in all areas except RVN.

⁷/AN/APX-44 is only installed in FY-61 aircraft. Either the AN/APX 44 or AN/APX-72 can be installed in FY-62 and subsequent aircraft.

⁸/See AR 95-71 for production/retrofit objectives for installation of CPO for AN/ARC-114.

⁹/The AN/ARC-115 and the AN/ARC-134 are to be retrofitted into selected Army Aircraft to replace the AN/ARC-73 and T-366/ARC. Refer to AR 95-71 for details.

¹⁰/The AN/ASH-19 is to be retrofitted into all CH-47 aircraft. Refer to AR 95-71 for details.

2-2. Avionics and Surveillance Equipment Configurations (CONT).

CH-54		CH-54A (FY 66-68)	CH-54B (FY 69-70)					
TYPE NUMBER	FUNCTION/NOUN							
AM-3209()/ASN	Servo Amplifier	1	1					
*AM-3782/ASW-23	Lag Amplifier	1						
*AM-4808/ASW-29	Amplifier	1						
AM-6279()/ASW	AFCS Amplifier		1					
AM-6280()/ASW	AFCS Amplifier		1					
AN/APX-44/72	IFF Transponder	¹ /1	1					
AN/ARC-51BX	UHF-AM Radio Set	1	1					
AN/ARC-54/131	VHF-FM Radio Set	² /1	² /1					
AN/ARC-102	HF-AM Radio Set	CPO	CPO					
AN/ARC-134/73	VHF-AM Radio Set	³ /1	1					
AN/ARN-82	VOR Receiver	1	1					
AN/ARN-83	ADF Receiver	1	1					
AN/ASH-19	Voice Warning Set	⁴ /1	⁴ /1					
AN/ASH-23	Voice Warning-Recorder	⁴ /1	⁴ /1					
AN/ASN-43	Gyro Compass	1	1					
AS-1304()/ARN	VOR Antenna	1	1					
AS-1703()/AR	FM Comm Antenna	1	1					
AS-1922()/ARC	FM Homing Antenna	1	1					
AT-884()/APX	IFF Antenna	1	1					
AT-1108()/ARC	UHF/VHF Antenna	1	1					
BB-434()/A	Battery	1	1					
C-1611()/AIC	Intercom Set	5	5					
C-4209()/ARC	Control (T-366()/ARC)	⁵ /1						
*C-7263/ASW-29	Remote Stick	1						
*C-7264/ASW-29	Channel Monitor	1						

2-2. Avionics and Surveillance Equipment Configurations (CONT).

CH-54		CH-54A (FY 66-68)	CH-54B (FY 69-70)					
TYPE NUMBER	FUNCTION/NOUN							
*C-7265/ASW-29	APCS Control Panel	1						
*C-7266()/ASW-29	Control (AFCS)	1	1					
*C-7269()/ASW	Control (AN/ASW-29)	1						
C-8157()/ARC	Control-Ind. Assembly	CPO	1					
*C-8476()/ASW	Control (AFCS)		1					
*C-8477()/ASW	Control-Monitor (AFCS)		1					
*C-8478()/ASW	Controller (AFCS)		1					
*CN-1179()/ASW	Displacement Gyro	1						
CN-1314()/A	Gyroscope		2					
CN-1325()/ASW	Gyroscope		4					
CU-942()/ARC	FM Antenna Coupler	1	1					
CU-991()/AR/ CU-16584	HF Antenna Coupler	³ /1	CPO					
F-726()/AR	Filter							
ID-250()/ARN	Course Indicator	1	1					
ID-998()/ARN	RMI Indicator	1	1					
*ID-1464/ASW-29	Hover Indicator	1						
ID-1720()/ASW	Indicator (AFCS)		1					
KIT-1A/TSEC	IFF Computer	CPO	CPO					
MD-736()/A	Signal Discriminator	CPO	3					
MT-1142()/ARC	Mount (T-366()/ARC)	⁵ /1						
MT-1719()/AR/ MT-3772/A	Mount (CU-991()/AR)/ CU-1658/A	³ /CPO	CPO					
MT-3802()/ARC	Mount (KY-28)	CPO	1					
MX-8611()/ASW	Accelerometer (AFCS)		2					
PP-2792()/ARN-30D	Power Supply	⁵ /1						

2-2. Avionics and Surveillance Equipment Configurations (CONT).

CH-54		CH-54A (FY 66-68)	CH-54B (FY 69-70)					
TYPE NUMBER	FUNCTION/NOUN							
PU-543()/A	Inverter	1	1					
*SN-409/ASW-29	Position Sensor	1						
*SN-410()/ASW-29	Synchro (AFCS)	1	1					
SN-441()/ASW	Synchro (AFCS)		2					
SN-442()/ASW	Synchronizer (AFCS)		2					
T-366()/ARC	VHF-AM Transmitter	⁵ /1						
TS-1843()/APX	IFF Test Set	CPO	CPO					
TSEC/KY-28	Comm Security Set	CPO	CPO					
TW-333/ASH-19	Message Tape		2					
752-600 (National)	Signal Adapter		1					
SIK6460-65010-041	ADF Sense Antenna	1	1					

¹/Either the AN/APX-44 or AN/APX-72 may be installed, but not both.

²/Either the AN/ARC-54 or AN/ARC-131 may be installed, but not both.

³/FY-66, CH-54A have AN/ARC-73, CU-991()/AR, and MT-1719()/AR provisions installed.

⁴/The AN/ASH-19 and AN/ASH-23 are to be retrofitted into all CH-54 aircraft. Refer to AR 95-71 for details.

⁵/Installed in FY-66 CH-54A aircraft.

*Components of the AN/ASW-29 Flight Control System installed in the CH-54A. As indicated some of these components are also used in the AFCS system installed in the CH-54B, which does not have a complete system designation.

2-2. Avionics and Surveillance Equipment Configurations (CONT).

OH-6A		OH-6A (FY 65-67)	OH-6A (FY 68-69)					
TYPE NUMBER	FUNCTION/NOUN							
**AM-12049	Filter (Static Inv)	1						
AN/APX-72	IFF Transponder		1					
AN/ARC-51BX	UHF-AM Radio Set	1	¹ /1					
AN/ARC-54/131	VHF-FM Radio Set	1						
AN/ARC-111	VHF-AM Radio Set	² /CPO						
AN/ARC-114	VHF-FM Radio Set #1		1					
AN/ARC-114	VHF-FM Radio Set #2		⁴ /1					
AN/ARC-115	VHF-AM Radio Set		1					
AN/ARC-116	UHF-AM Radio Set		¹ /CPO					
AN/ARN-83	ADF Receiver	1						
AN/ARN-89	ADF Receiver		1					
AN/ASN-43	Gyro Compass	1	1					
AS-1703()/AR	FM Comm Antenna		² /1					
AT-884()/APX	IFF Antenna		1					
BB-641()/A	Battery	1						
BB-678()/A	Battery		1					
C-1611()/AIC	Intercom Set	3						
C-6533()/AIC	Intercom Set		3					
C-8157()/ARC	Control-Ind Ass'y		CPO					
CU-1794()/ARC	#1 FM Homing Transformer		2					
CU-1796()/ARC	#1 FM Homing Hybrid Ntwk		1					
CU-1893()/ARC	# 1 FM Coupler		1					
CU-1759/ARC	FM Antenna Coupler	1						
CU-1894()/ARC	#2 FM Coupler		² /1					

2-2. Avionics and Surveillance Equipment Configurations (CONT).

OH-6A		OH-6A (FY 65-67)	OH-6A (FY 68-69)					
TYPE NUMBER	FUNCTION/NOUN							
ID-1351()/A	Course Indicator	1	1					
KIT-1A/TSEC	IFF Computer		CPO					
CCC #HPF 40-06	FM Hipass Filter		2					
CCC #HPF 40-07	UHF Band Pass Filter		1					
CCC #HPF 40-08	VHF Hi Pass Filter		1					
PP-6674	Static Inverter	1						
TS-1843()/APX	IFF Test Set		CPO					
TSEC/KY-28	Comm Security Set		CPO					
**Hughes #369A 4385	Homing Damp Network		³ /1					
**Hughes #369A 4420	Hdset/Mic Filter Assy	1						
**Hughes #369A 4508	FM Homing Transformer	2						
**Hughes #369A 4507	Homing Hybrid Ntwk	1						
**Hughes #369A 4554	Static Inverter	1						
**Hughes #369A 4575-3	UHF/VHF Ant Diplexer	1						
**Hughes #369A 4675	UHF/VHF Ant Diplexer		1					
-----	Heli Pass Filter Assy	2						
**Hughes #369A 6471	Mount (KY-28)		1					
**Hughes #369A 6472	Mount (KIT-1A TSEC)		1					

¹/AN/ARC-51BX has been installed in lieu of AN/ARC-116. Replacement is predicated on availability of the AN/ARC-116.

²/Installed in SN 68-17353 and subsequent aircraft.

³/Installed in SN 68-17306 and subsequent aircraft.

⁴/FY-68-69 aircraft contain wiring provisions for 2 ea AN/ARC-114, 1 ea AN/ARC-115 and 1 ea AN/ARC-116; however the maximum number of sets that can be installed at any given time is 3, i.e. 1 ea AN/ARC-114, 1 ea AN/ARC-115, 1 ea AN/ARC-116 or 2 ea AN/ARC-114 and 1 ea AN/ARC-115 or 2 ea AN/ARC-114 and 1 ea AN/ARC-116.

** Commercial Item.

2-2. Avionics and Surveillance Equipment Configurations (CONT).

OH-13S		OH-13S						
TYPE NUMBER	FUNCTION/NOUN							
AN/ARA-56	FM Antenna Group	1						
AN/ARC-45	UHF-AM Radio Set	1						
AN/ARC-54/131	VHF-FM Radio Set	1						
AN/ARC-73/111	VHF-AM Radio Set	CPO						
AN-3151-2	Battery	1						
AS-1703()/ARC	VHF-FM Antenna	1						
AT-1108()/ARC	UHF-VHF Antenna	1						
C-1611()/AIC	Intercom Set	2						
CU-942()/ARC	Coupler	1						
ID-48()/ARN	Course Indicator	1						

2-2. Avionics and Surveillance Equipment Configurations (CONT).

OH-58A		OH-58A						
TYPE NUMBER	FUNCTION/NOUN							
AN/APX-72	IFF Transponder	1						
AN/ARC-114	VHF-FM Radio Set #1	1						
AN/ARC-114	VHF-FM Radio Set #2	CPO						
AN/ARC-115	VHF-AM Radio Set	1						
AN/ARC-116/51BX	UHF-AM Radio Set	¹ /1						
AN/ARN-89	ADF Receiver	1						
AN/ASN-43	Gyro Compass	1						
AS-2485	No 2 FM Comm Ant	1						
AS-2486	No 1 FM Homing Ant (LH)	1						
AS-2487	UHF Comm Ant	1						
AS-2670	No 1 FM Homing Ant (RH)	1						
AT-884()/APX	IFF Antenna	1						
BB-676()/A	Battery	1						
C-6533/ARC	Intercom Set	3						
C-8157/ARC	Indicator Control	CPO						
ID-1351()/A	Course Indicator	1						
KIT-1A/TSEC	IFF Computer	CPO						
MT-()	Mount (KY-28)	1						
MT-()	Mount (KIT-A/TSEC)	1						
PP-6376/A	Static Inverter	1						
TS-1843()/APX	IFF Test Set	CPO						
TSEC/KY-28	Comm Security Set	CPO						
Bell #206-032-310	ADF Sense Antenna	1						
Bell #206-075-380	FM Low Pass Filter	1						
Bell #206-075-381	UHF Hi Pass Filter	1						

2-2. Avionics and Surveillance Equipment Configurations (CONT).

OH-58A		OH-58A						
TYPE NUMBER	FUNCTION/NOUN							
Bell #206-075-382	VHF Band Pass Filter	1						
Bell #206-075-483-1	Impedance Match NTWK	1						
Bell #206-075-518	VHF-AM and No. 1 VHF-FM Comm Antenna	1						
Bell #206-075-597-1	Audio Threshold (MD- ())	1						

¹/The AN/ARC-51BX was installed in lieu of the AN/ARC-116 during initial FY 68-69 production. Replacement of the AN/ARC-51BX is predicated on availability of AN/ARC-116 in these aircraft. FY-70 OH-58A aircraft have the AN/ARC-116 installed.

2-2. Avionics and Surveillance Equipment Configurations (CONT).

UH-1		UH-1B/C (FY 60-62)	UH-1B/C (FY 63-67)	UH-1D/H (FY 62-70)	UH-1H (FY-71)	UH-1M		
TYPE NUMBER	FUNCTION/NOUN							
AM-3209()/ASN	Servo Amplifier	1	1	1	1	1		
AN/AAS-29	IR Night Vision Sys					² /1		
AN/APX-44/72	IFF Transponder	1	1	⁴ /1	1	1		
AN/ARC-51BX	UHF-AM Radio Set	1	1	1	1	1		
AN/ARC-54/131	VHF-FM Radio Set	1	1	1	1	1		
AN/ARC-73	VHF-AM Radio Set	CPO				² /CPO		
AN/ARC-102	HF-AM Radio Set	CPO	CPO	CPO	CPO	CPO		
AN/ARC-114	VHF-AM Radio Set #2		⁷ /CPO	⁷ /CPO	⁷ /CPO			
AN/ARC-115/134	VHF-AM Radio Set		⁸ /1	⁸ /1		² /1		
AN/ARN-30/82	VOR Receiver	⁹ /1	¹⁰ /1	1	1	⁹ /1		
AN/ARN-59/83	ADF Receiver	⁹ /1	1	1	1	⁹ /1		
AN/ASN-43/J-2	Gyro Compass	⁹ /1	1	1	1	⁹ /1		
AN/ASQ-132	Night Vision Image St					² /1		
AS-1304()/ARN	VOR Antenna	1	1	1	1	1		
AS-1703()/AR	FM Comm Antenna	1	1	1	1	1		
AS-1922()/ARC	FM Homing Antenna	1	1	1	1	1		
AT-640()/ARN	Marker Beacon Ant	1	1	1	1	1		
AT-884/APX	IFF Antenna	1	1	1	1	1		
AT-1108()/ARC	UHF-VHF Comm Ant	1	1	1	1	1		
BB-433()/A	Battery	1	1	1	1	1		
C-1611()/AIC	Intercom Set	4	4	4		4		
C-6533	Intercom Set				4			
C-8157()/ARC	Control-Ind Assembly	CPO	CPO	⁶ /CPO	1	CPO		
CU-991()/ARC/ CU-1658/A	HF Antenna Coupler	CPO	CPO	⁵ /CPO		CPO		

2-2. Avionics and Surveillance Equipment Configurations (CONT).

UH-1		UH-1B/C (FY 60-62)	UH-1B/C (FY 63-67)	UH-1D/H (FY 62-70)	UH-1H (FY-71)	UH-1M		
TYPE NUMBER	FUNCTION/NOUN							
CU-942/ARC	FM Antenna Coupler	1	1	1	1	1		
CV-1275()/ARN	RMI Converter	⁹ /1				² /1		
ID-250()/ARN	Course Indicator	1	1	1	1	1		
ID-998()/ASN	RMI Indicator	1	1	1	1	1		
ID-1347()/ARN-82	Course Indicator		³ /1	³ /1	³ /1	³ /1		
KIT-1A/TSEC	IFF Computer	CPO	CPO	CPO	CPO	CPO		
MC-1	Rate Switch Gyro	1	1	1	1	1		
MD-1	Roll/Pitch Disp Gyro	1	1	1	1	1		
MD-736()/AR	Signal Discriminator	4	4	4		4		
MT-1719()/AR/ MT-3772/A	Mount (CU-991()/AR)/ CU-1658/A	CPO	CPO	⁵ /CPO		CPO		
MT-3802()/ARC	Mount (KY-28)	CPO	CPO	⁶ /CPO	1	CPO		
PU-543()/A	Inverter	2	2	2	2	2		
R-1041()/ARN	Marker Beacon Rec	CPO	CPO	CPO	¹⁰ /1	CPO		
T-366()/ARC	VHF-AM Transmitter	1				² /1		
TS-1843()/APX	IFF Test Set	CPO	CPO	CPO	CPO	CPO		
TSEC/KY-28	Comm Security Set	CPO	CPO	CPO	CPO	CPO		
Bell #205-706-027-1	HF Antenna Kit	CPO	CPO	CPO	CPO	CPO		
Bell	Audio Threshold System				1			

¹/Provisions for AN/ARC-102, CU-991()/AR, MT-1719()/AR, and HF Antenna Kit are not installed in FY-62 UH-1D aircraft.

²/The UH-1M is a converted UH-1C aircraft. These items may or may not be installed depending on serial number of aircraft involved. AN/ARC-73 is installed in FY 60-62 UH-1B/C.

³/The ID-1347()/ARN is part of the AN/ARN-82, however, there are cases where other components of the AN/ARN-82 are removed leaving this item for use with the Homing antenna Group.

⁴/Only AN/APX-72 can be installed in SN 68-15214 and subsequent.

2-2. Avionics and Surveillance Equipment Configurations (CONT).

⁵/Provisions for CU-1658 and MT-3772 are only installed in 68-15214 and subsequent.

⁶/C-8157 and MT-3802 are installed in production for FY-70 and subsequent.

⁷/AN/ARC-114 number two FM applied to UH-1C/D/H models only. Refer to AR 95-71 for details.

⁸/AN/ARC-115 will be installed in all UH-1C/D/H and USAREURS. UH-1B not equipped with AN/ARC-134. Refer to AR 95-71 for details.

⁹/AN/ARN-30(), AN/ARN-59, J-2, and CV-1275 are installed in FY 60-62 UH-1B/C/M aircraft.

¹⁰/The AN/ARN-82 and R-1041/ARN are removed when aircraft are deployed in RVN.

2-2. Avionics and Surveillance Equipment Configurations (CONT).

TH-13T		TH-13T (FY 64-66)	TH-13T (FY 67)					
TYPE NUMBER	FUNCTION/NOUN							
AM-3209()/ASN	Servo Amplifier		1					
AN/ARC-45	UHF-AM Radio Set	1						
AN/ARC-51BX	UHF-AM Radio Set		1					
AN/ARN-30() *(ARC TYPE 15F)	VOR Receiver	1						
AN/ARN-59 *(ARC TYPE 21A)	ADF Receiver	1						
AN/ARN-82	VOR Receiver		1					
AN/ARN-83	ADF Receiver		1					
AS-580()/ARN *(ARC TYPE 13B)	VOR Antenna	1						
AS-1304()/ARN	VOR Antenna		1					
AT-450()/ARC	UHF Comm Antenna	1	1					
AT-640()/ARN	Marker Beacon Antenna	1	1					
AT-780()/ARN (ARC TYPE L-11)	ADF Loop Antenna	1						
ARC A-326A	Glideslope Antenna	1	1					
BB-432()/A	Battery	1	1					
C-1611()/AIC	Intercom Set	2	2					
CN-405/ASN	Magnetic Flux Comp	1	1					
CV-1275()/ARN *ARC TYPE B-18	RMI Converter	1						
DG-401/ASN	Directional Gyro	1	1					
*ARC TYPE 1N-10-1	Course Indicator	1						

2-2. Avionics and Surveillance Equipment Configurations (CONT).

TH-13T		TH-13T (FY 64-66)	TH-13T (FY-67)					
TYPE NUMBER	FUNCTION/NOUN							
ID-998()/ASN	RMI Indicator		1					
ID-1347()/ARN	Course Indicator		1					
Sperry C-6H	RMI Indicator	1						
Sperry 178367-1	Servo Amplifier	1						
PU-542()/A	Inverter	1	1					
R-844()/ARN	MB/GS Receiver	1	1					
T-611/ASN	Remote Compass	1	1					

*Commercial item

2-2. Avionics and Surveillance Equipment Configurations (CONT).

TH-55A		TH-55A						
TYPE NUMBER	FUNCTION/NOUN							
*ARC Type-524M	VHF-AM Radio Set	1						
MX-1646/AIC	Headset Adapter	1						
*12-GCAB-9F (Gill Mfg)	Battery	1						
*ARC TYPE A-25A	VHF Communication Antenna	1						

*Commercial Item

2-2. Avionics and Surveillance Equipment Configurations (CONT).

O-1G		O-1G						
TYPE NUMBER	FUNCTION/NOUN							
AN-3154-1A	Battery	1						
AN/APX-93	Transponder	¹ /1						
AN/ARA-56	FM Antenna Group	1						
AN/ARC-44	VHF-FM Radio Set							
AN/ARC-51BX	UHF-AM Radio Set	1						
AN/ARC-54/131	VHF-FM Radio Set	2						
ARC TYPE 12	VHF-FM	CPO						
AN/ARN-59	ADF Receiver	1						
AS-1703()/ARC	FM-Comm Antenna	2						
AT-1108()/ARC	UHF Comm Antenna	1						
C-1611()/AIC	Intercom Set	2						
C-8157()/ARC	Control-Ind Ass'y	CPO						
CU-942()/AR	FM Antenna Coupler	2						
ID-48()/AR	Course Indicator	1						
MD-736/A	Discriminator	2						
MT-3802()/ARC	Mount (KY-28)	CPO						
TSEC/KY-28	Comm Security Set	CPO						

¹/Refer to MWO 55-1510-202-30/9 for serial number applicability.

2-2. Avionics and Surveillance Equipment Configurations (CONT).

OV-1		OV-1A	OV-1B	OV-1C	OV-1D			
TYPE NUMBER	FUNCTION/NOUN							
AN/AAS-14() A and B	IR Detecting Set			1				
AN/AAS-24	IR Detecting Set				¹ /CPO			
AN/ADR-6	Radiac Set				CPO			
AN/AJA-5	Synchrophaser	1	1	1	1			
AN/AKT-18()	Radar Data System		1					
AN/ALQ-67	Countermeasure Set		CPO	CPO	CPO			
AN/ALQ-80	Countermeasure Set				CPO			
AN/APN-22/171	Radar Altimeter	1	1	⁸ /1	⁸ /1			
AN/APR-25	Radiation Det Rec				1			
AN/APR-26	Radiation Det Rec				1			
AN/APS-94C	SLAR		1					
AN/APS-94D	SLAR				¹ /CPO			
AN/APX-44/72	IFF Transponder	1	1	1	1			
AN/ARC-51BX	UHF-AM Radio Set	1	1	1	1			
AN/ARC-54/131	VHF-FM Radio Set	1	1	1	1			
AN/ARC-102	HF-AM Radio Set	⁵ /CPO	⁵ /CPO	⁵ /CPO	⁵ /CPO			
AN/ARC-114	VHF-FM Radio Set #1		⁹ /CPO	⁹ /CPO	1			
AN/ARC-114	VHF-FM Radio Set #2				CPO			
AN/ARC-115	VHF-AM Radio Set				1			
AN/ARC-134	VHF-AM Radio Set	1	1	1				
AN/ARN-30E/82	VOR Receiver	1	1	3	1			
AN/ARN-52/103	TACAN Set	² /CPO	² /CPO	² /CPO	² /CPO			
AN/ARN-59/83	ADF Receiver	1	3	3				
AN/ARN-89	ADF Receiver				1			

2-2. Avionics and Surveillance Equipment Configurations (CONT).

OV-1		OV-1A	OV-1B	OV-1C	OV-1D			
TYPE NUMBER	FUNCTION/NOUN							
AN/ART-41A	Data Transmitter			CPO				
AN/ASN-33	Nav Computer Set	1	1	1	1			
AN/ASN-64	Doppler Nav Set		1	1				
AN/ASN-76	Attitude Ref Set	CPO	1	1	1			
AN/ASN-86	Inertial Nav Sys				1			
AN/ASW-12	Auto-Pilot	1	1	1	1			
AN/AYA-5	Data Annotation Sys			CPO				
AN/AYA-10	Data Annotation Sys				CPO			
AS-1703()/ARC	FM Comm Antenna	1	1	1				
AS-2042()/ARC	FM Homing Ant	1	1	1	1			
AS-2285()/ARC	FM Comm Antenna				1			
AT-134()/A	ADF Antenna	1	1					
AT-450()/A	Data Link Antenna		1	1				
AT-741()/AR	IFF & TACAN Antenna	4	4	4	4			
AT-1108()/ARC	UHF-VHF Comm Antenna	1	1	1	1			
BB-433()/A--	Battery	1	1	1	1			
C-1611()/AIC--	Intercom Set	2	2	2				
C-6533()/ARC	Intercom Set				2			
C-8157/ARC	Control Ind Assy	CPO	CPO	CPO	CPO			
CN-1072()/AJN	Detector Compensator	CPO	1	1	1			
CU-942()/ARC	FM Antenna Coupler	1	1	1	1			
CU-1658()/A	HF-AM Ant Coupler	⁵ /CPO	⁵ /CPO	1	1			
DT-309()/AJN	Flux Valve	CPO	1	1	1			
ID-250()/ARN	Course Indicator		⁴ /1					

2-2. Avionics and Surveillance Equipment Configurations (CONT).

OV-1								
TYPE NUMBER	FUNCTION/NOUN	OV-1A	OV-1B	OV-1C	OV-1D			
ID-663()/U	DME Course Indicator	1	⁴ /1	1	1			
KA-30(A)	Still Picture Camera	CPO	CPO					
KA-60(C)	Still Picture Camera	CPO		CPO	⁶ /CPO			
KA-76(A)	Still Picture Camera			CPO	CPO			
KA-60B	Still Picture Camera	CPO						
KIT-1A/TSEC	IFF Computer	CPO	CPO	CPO	CPO			
KS-104A	Photo Surv Sys							
KS-104B	Photo Surv Sys			1				
KS-113(A)	Photo Surv Sys				1			
LS-38(A)	Photo Cont Sys	1	1					
LS-59(A)	Photo Flasher Sys	CPO	CPO	CPO	CPO			
MA-1	Compass Sys	1						
MD-736()/A	Signal Discriminator	⁷ /CPO	⁷ /CPO	⁷ /CPO				
MS-2520-1	Inverter				1			
PN 32B27-8								
MT-3772A/A	Mount (CU-1658A/A)	⁵ /CPO	⁵ /CPO	1	1			
MT-3802/ARC	Mounting	CPO	CPO	1	CPO			
PU-544()/A	Inverter	1	1	2	1			
PU-545()/A	Inverter		2	2	2			
R-844()/ARN-58	MB/GS Receiver	1	1	1	1			
RO-166/UP	Photo Processor		1	1	1			
TS-1843/APX	IFF Test Set	CPO	CPO	CPO	CPO			
TSEC/KY-28	Comm Security Set	CPO	CPO	CPO	CPO			

2-2. Avionics and Surveillance Equipment Configurations (CONT).

¹/The OV-1D has made possible interchangeability of the AN/AAS-24 and AN/APS-94D systems.

²/Either the AN/APX-44 or AN/APX-72 is installed but not both. Either the AN/ARC-54 or AN/ARC-131 is installed but not both. The AN/ARN-52 or AN/ARN-103 can be installed but not both. An MWO is being prepared against the OV-1D to update the wiring so that the AN/ARN-103 will interface with the AN/ASN-86.

³/Aircraft prior to FY-66 have the AN/ARN-30E and AN/ARN-59 installed. FY-66 aircraft have the AN/ARN-82 and AN/ARN-83 installed.

⁴/The ID-663/U provisions have been adapted to ID-250()/ARN in early model aircraft. Late model aircraft have ID-663/U installed.

⁵/AN/ARC-102 will be installed when mission dictates.

⁶/Provisions for 2 each KA-60C are installed in OV-1D aircraft.

⁷/Partial provisions exist for the MD-736()/A.

⁸/The AN/ADN-171 is installed in FY-68C and all OV-1D aircraft.

⁹/Refer to AR 95-71 for AN/ARC-114 retrofit objectives.

2-2. Avionics and Surveillance Equipment Configurations (CONT).

U-8								
TYPE NUMBER	FUNCTION/NOUN	U-8D	U-8F	U-8G	RU-8D			
AM-3209/ASN	Servo Amplifier	1	1	1				
AN/APX-44/72	IFF Transponder	1	1	1	1			
AN/APX-158	Weather Radar		1					
AN/ARA-54	Glide Slope Receiver	1	1	1				
AN/ARC-51BX	UHF-AM Radio Set	1	1	1	1			
AN/ARC-54/131	VHF-FM Radio Set	1	1	1	1			
AN/ARC-73	VHF-AM Radio Set	² /CPO	² /CPO		1			
AN/ARC-102	HF-AM Radio Set	CPO	CPO	CPO	1			
AN/ARC-115/134	VHF-FM Radio Set	² /1	² /1	² /1				
AN/ARN-12/32	Marker Beacon	1	1	1				
AN/ARN-30E	VOR Receiver	1	1	1	1			
AN/ARN-52	TACAN Set	CPO	CPO	CPO				
AN/ARN-59	ADF Receiver	1	1	1	2			
AN/ASN-13	Gyro Compass	1	1	1				
AN/ASN-64	Doppler Navigational Set				1			
AN/UPN-25	Beacon Set				1			
AS-1703()/AR	FM Comm Antenna	1	1	1	1			
AT-741()/AR	TACAN Antenna	1	1	1				
AT-884()/APX-44	IFF Antenna	1	1	1	1			
AT-1108()/ARC	UHF-VHF Comm Antenna	1	1	1	1			
BB-432()/A	Battery	1	1	1	1			
C-12	Gyro Compass				1			
C-1611()/AIC	Intercom Set	2	2	2	3			
C-8157()/ARC	Control-Ind Assembly	CPO	CPO	CPO	1			

2-2. Avionics and Surveillance Equipment Configurations (CONT).

U-8								
TYPE NUMBER	FUNCTION/NOUN	U-8D	U-8F	U-8G	RU-8D			
CU-942()/ARC	FM Comm Antenna	1	1	1	1			
CU-1658()/A	HF Antenna Coupler	CPO	CPO	CPO	1			
CV-1275()/ARN	RMI Converter	1	1	1	1			
ID-250/ARN	Course Indicator	¹ /1	¹ /1	¹ /1	1			
ID-387()/ARN	Course Indicator	¹ /CPO	¹ /CPO	¹ /CPO	1			
MC-1	Gyro	1	1	1	1			
ID-663()/U	BDH Indicator	¹ /CPO	¹ /CPO	¹ /CPO				
ID-998()/ASN	RMI Indicator	1	1	1	1			
Kit-1A/TSEC	IFF Computer	CPO	CPO	CPO	CPO			
MT-3772A/A	Mount (CU-1658A)	CPO	CPO	CPO	1			
MT-3802()/ARC	Mount (KY-28)	CPO	CPO	CPO	1			
PU-544()/A	Inverter	2	2	2	2			
R-884/ARN-58	Radio Receiver				1			
T-366()/ARC	VHF-AM Transmitter	² /1	² /1		1			
TS-1843()/APX	IFF Test Set	CPO	CPO	CPO				
TSEC/KY-28	Comm Security Set	CPO	CPO	CPO	CPO			

¹ID-387/ARN and ID-663/U installed in lieu of ID-250/ARN when the AN/ARN-52 is installed.

²AN/ARC-134 applies to USAREUR project ZYU; AN/ARC-115 applies to balance of aircraft. Refer to AR 95-71 for further details. AN/ARC-73 and T-366 are removed when AN/ARC-115/134 are installed.

2-2. Avionics and Surveillance Equipment Configurations (CONT).

U-10A		U-10A						
TYPE NUMBER	FUNCTION/NOUN							
AN/ARA-31	FM Antenna Group	CPO						
AN/ARC-44	VHF-FM Radio Set	CPO						
AN/ARC-51	UHF-AM Radio Set	CPO						
AN/ARC-73	VHF-AM Radio Set	1						
*176-7A/51X-2B								
AN/ARN-30	VOR Receiver	1						
*ARC TYPE 15F								
AN/ARN-32	Marker Beacon Rec	1						
AN/ARN-59	ADF Receiving Set	1						
*ARC TYPE 21A								
AT-1108/AR	UHF-VHF Antenna	1						
*37R-2U								
BB-432/A	NICAD Battery	1						
C-1611()/AIC	Intercom Set	3						
*CD-4(ARC Type)	Course Indicator	1						
H-103/U	Helmet	3						
*PU-542/A	Inverter	1						

*/Commercial Equivalent Installed.

2-2. Avionics and Surveillance Equipment Configurations (CONT).

U-21 & RU-21		RU-21A	RU-21B	RU-21C	RU-21D	RU-21E	U-21A/G	
TYPE NUMBER	FUNCTION/NOUN							
A-339D-1	DME Indicator	1	1	1	1	1	1	
AM-3209()/ASN	Servo Amplifier	1	1	1	1	1	1	
AN/APN-158	Weather Radar	1	1	1	1	1	1	
AN/APR-25	Emergency Receiver				¹ /1	¹ /CPO		
AN/APR-26	Emergency Receiver				¹ /1	¹ /CPO		
AN/APR-36	Emergency Receiver				CPO	CPO		
AN/APR-37	Emergency Receiver				CPO	CPO		
AN/APX-44/72	IFF Transponder	1	1	1	1	1	1	
AN/ARC-51BX	UHF-AM Radio Set	1	1	1	1	1	1	
AN/ARC-54/131	VHF-FM Radio Set	1	1	1	1	1	1	
AN/ARC-102	HF-AM Radio Set	1	1	1	1	1	CPO	
AN/ARC-134	VHF-AM Radio Set	1	1	1	1	1	1	
AN/ARN-52/103	TACAN Set	² /1	² /1	² /1	² /1	² /1	² /1	
AN/ARN-82	VOR Receiver	1	1	1	1	1	1	
AN/ARN-83	ADF Receiver	1	1	1	1	1	1	
AN/ASN-43	Gyro Compass	1			1	1	1	
AN/ASN-86	Guidance System	1	1	1	1	1		
AS-580()/ARN	VOR Antenna	1	1	1	1	1	1	
AS-1703()/AR	FM Comm	1					1	
AS-1869()/ARN	ADF Sense Antenna						1	
AS-1922()/ARC	Homing Antenna	1	1	1	1	1	1	
AS-2285()/ARC	FM Comm Antenna	1	1	1	1	2		
AT-454()/ARC	HF Comm Antenna				1	1		
AT-640()/ARN	Marker Beacon Ant	1	1	1	1	1	1	
AT-884()/APX	IFF & TACAN Antenna	2	2	2	2	2	2	

2-2. Avionics and Surveillance Equipment Configurations (CONT).

U-21 & RU-21		RU-21A	RU-21B	RU-21C	RU-21D	RU-21E	U-21A/G	
TYPE NUMBER	FUNCTION/NOUN							
AT-1108()/ARC	UHF/VHF Comm Antenna	1	1	1	1	1	1	
BB-433()/A	Battery	1	1	1	1	1	1	
C-1611()/AIC	Intercom Set	3	3	3	3	4	3	
C-8157()/ARC	Control-Ind Assembly	CPO	CPO	CPO	CPO	2	CPO	
CN-405()/ASN	Mag Flux Compensator	2	2	2	1	1		
Collins 582-A	Quad Error Corrector	1	1	1			1	
CU-942()/ARC	FM Antenna Coupler	1					1	
CU-1658()/A	HF Antenna Coupler	1	1	1	1	1	CPO	
H-14	Auto Pilot	1	1	1				
ID-250()/ARN	Course Indicator				1	2	1	
ID-387()/AR	TACAN Course Ind	1	1	1	1	1	1	
ID-998()/ASN	RMI Indicator	1	1	1	1	1	1	
KIT-1A/TSEC	IFF Computer	CPO	CPO	CPO	CPO	CPO	CPO	
MC-1	Rate Switch Gyro				1	1	2	
MD-1	Roll/Pitch Disp Gyro				1	1	2	
MD-736/A	Signal Discriminator	3	3	3	3	4	3	
MGH-229-100	Inverter	1	1	1				
MT-3772()/A	Mount (CU-1658()/A)	1	1	1	1	1	1	
MT-3802/ARC	Mount (KY-28)	CPO	CPO	CPO	CPO	2	CPO	
PU-543()/A	Mount				1			
PU-544()/A	Mount					1		
PU-545()/A	Mount	2	2	2	2	2	2	
R-844()/ARN-58	MB/GS Receiver	1	1	1	1	1	1	
T-611()/ASN	Compass Transmitter	2	2	2	1	1		
T-992()/A	Air Speed Trans				1	1		
TS-1843/APX	IFF Test Set	CPO	CPO	CPO	CPO	CPO	CPO	

2-2. Avionics and Surveillance Equipment Configurations (CONT).

U-21 & RU-21		RU-21A	RU-21B	RU-21C	RU-21D	RU-21E	U-21A/G	
TYPE NUMBER	FUNCTION/NOUN							
TSEC/KY-28	Comm Security Set	CPO	CPO	CPO	CPO	CPO	CPO	
50-345615	HF Antenna						CPO	
50-346063-3	HF Antenna				1	1		
50-640003-79	ADF Sense Antenna				1	1		

¹/Installed in selected aircraft.²/AN/ARN-103 will be installed on RU-21 series aircraft predicated on asset availability. AN/ARN-52 will be installed on U-21A/G aircraft.

2-2. Avionics and Surveillance Equipment Configurations (CONT).

T-41B		T-41B						
TYPE NUMBER	FUNCTION/NOUN							
AN/ARC-54/131	VHF-FM Radio Set	CPO						
AN/ARN-83	ADF Receiving Set	1						
AS-1703()/AR	VHF-FM Antenna	CPO						
AS-1922()/ARC	VHF-FM Hom Antenna	CPO						
C-1611()/AIC	Intercom Set	3						
CU-942()/ARC-54	FM Antenna Coupler	CPO						
ID-718/ARN	Azimuth Indicator	1						
*A-25A	Antenna	2						
*ARC-515R	VOR Receiver	1						
*P/N 08700-60-1	Battery (Cessna)	1						
*BEI-901C	VHF-AM Radio Set	1						
*P/N 23-401-20	Garvin Inc	1						
*P/N 23-501-03	Garvin Inc	1						
*0570039-1	Sense Antenna	1						
*37R-2A	Antenna	1						
*31640 (ARC 1N514R)	Indicator	1						

* Commercial Item.

2-2. Avionics and Surveillance Equipment Configurations (CONT).

T-42A		T-42A						
TYPE NUMBER	FUNCTION/NOUN							
AN/ARC-51BX	UHF-AM Radio Set	CPO						
AN/ARC-111	VHF-AM Radio Set	1						
AN/ARN-30() *(ARC Type 15F)	VOR Receiver	2						
AN/ARN-59 *(ARC Type 21A)	ADF Receiving Set	1						
AN/ARC-105	Transponder	1						
ARC Type A-13B	VOR Antenna	1						
ARC Type L-11	ADF Loop Antenna	1						
AT-1108()/ARC	UHF-VHF Antenna	1						
BB-432/A	NICAD Battery	1						
C-1611()/AIC	Intercom Set	4						
CV-1275()/ARN	RMI Converter	2						
ID-250()/ARN	Course Indicator	1						
ID-998()/ASN	Compass Indicator	1						
PU-542()/A	Inverter	2						
R-844()/ARN-58	MB/GS Receiver	1						
T-366()/ARC	Radio Transmitter	1						
*C-14	Gyro Compass	1						

* Commercial Item.

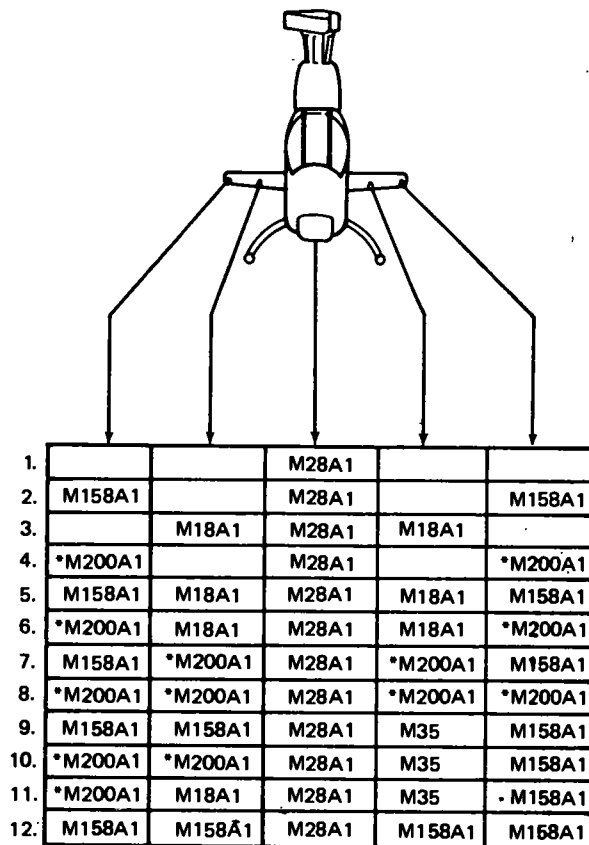
2-3. Aircraft Armament.

The following aircraft armament subsystems and related components are either in the Research and Development stage, or have been type classified for field usage.

2-4. Aircraft Armament Application.

ARMT SS	AIRCRAFT APPLICATION						
	UH-1B/C/M	UH-1D/H	AH-1G	OH-6A	OH-58A	CH-47A	Remarks
M5	X						
M18A1			X				
M21	X						
M23		X					
M24						X	
M27				X	X		
M28A1			X				
M35			X				
M41						X	
M59		X					
XM156	X						

2-5. AH-1G Armament Configurations.

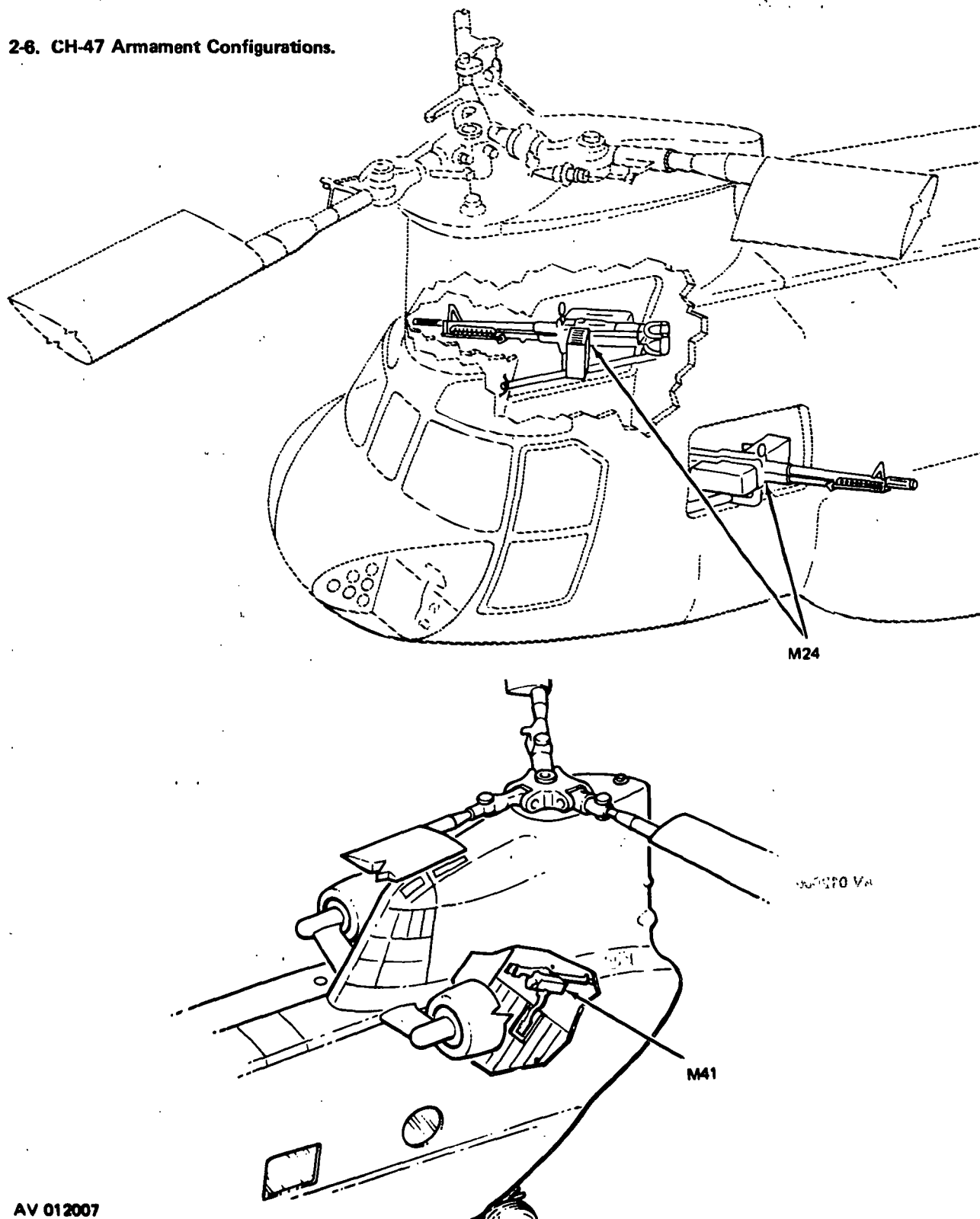


* (*M200A1) WHEN USING M229 WARHEADS THESE LAUNCHERS ARE LIMITED TO 12 ROCKETS ON OUTBOARD EXTERNAL STORES STATIONS LH AND RH DUE TO AH-1G LIMITATION.

NOTE: FOR ADDITIONAL INFORMATION SEE "2.75 INCH ROCKET LAUNCHERS" PARAGRAPH 2-26.

AV 012006

Figure 2-1. AH-1G Armament configurations

2-6. CH-47 Armament Configurations.

AV 012007

Figure 2-2. M-24 and M-41 Armament subsystems installed on CH-47 (Chinook) helicopter

2-7. UH-1B, C, and M Armament Configurations.

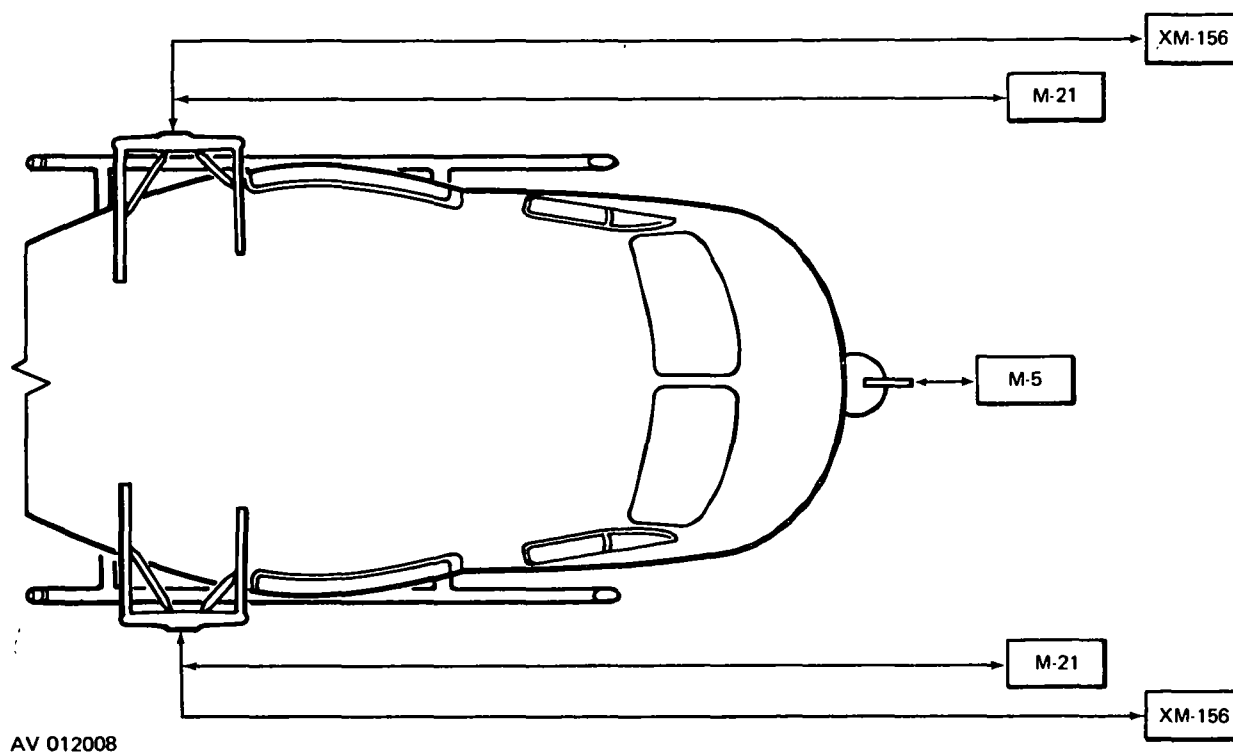
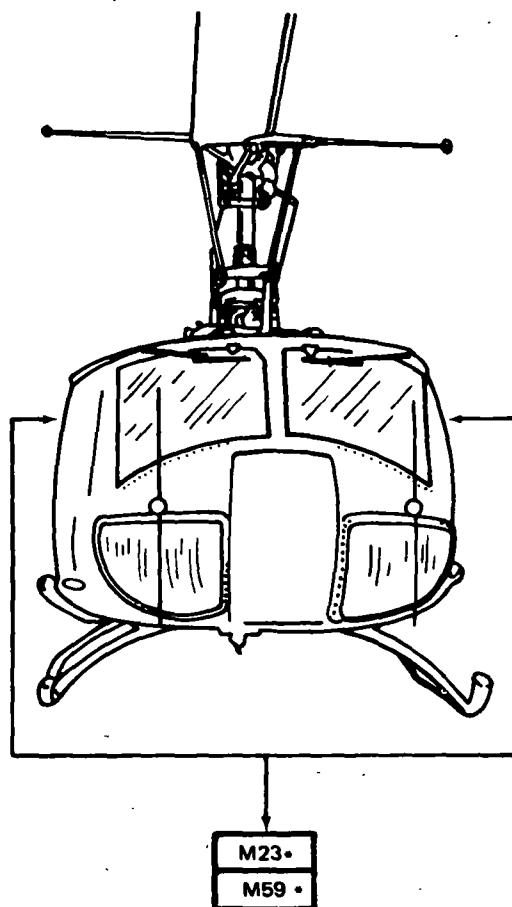


Figure 2-3. UH-1B, C, and M Armament configurations

2-8. UH-1D and H Armament Configurations.



•DOOR MOUNTED WEAPONS ONLY.

AV 012009

Figure 2-4. UH-1D and H Armament configurations

2-9. M5 Armament Subsystem, Grenade Launcher.**ARMAMENT SUBSYSTEM:** M5**APPLICABLE AIRCRAFT – TYPE, MODEL, SERIES:** Utility UH-1 B/C/M**AVERAGE PROCUREMENT PRICE:** \$29,826**TYPE CLASSIFICATION:** Standard A

NOMENCLATURE: Armament subsystem, helicopter, 40 millimeter grenade launcher. Nose mounted turret (1 launcher). M75 Grenade Launcher, air cooled, electric motor driven.

DESCRIPTION: The M5 is used on the UH-1B/C/M helicopters, and consists of a flexible remote controlled, servo-power driven gun turret mounted in the nose of the UH-1B/C/M helicopters. The turret incorporates one M75 grenade launcher. Linked ammunition is stored in a rotary ammo drum in the cargo hook hole, pulled through a flexible chute by an ammo booster, and fed to the grenade launcher. The system also has a box feed system in addition to the rotary AMMO drum. A master armament control panel is located in the instrument console and is accessible to both the pilot and copilot gunner. A flexible hand control sight assembly mounts above the co-pilot's seat from which the co-pilot can sight and fire the system. The subsystem can also be fired in the stow position by either the pilot or co-pilot by means of a trigger switch on both cyclic stick grips. In this mode, the turret is flexible in elevation. An MWO has been applied to the subsystem to give the sight lead angle compensation. A dual range reticle has been applied for more accuracy at long range.

CHARACTERISTICS:

EFFECTIVE RANGE:	1500 meters
ELEVATION/DEPRESSION:	+15°, -35°
MUZZLE VELOCITY:	790 FPS
RATE OF FIRE:	230 SPM
TRAVERSE:	60° right and left
EMPTY WT: Box Fed: 233 lbs	LOADED WT: 335 lbs (*150 rds)
Rotary Drum Fed: 223 lbs	459 lbs (**300 rds)
AMMUNITION:	
TYPE:	Linked 40mm ammunition.
CAPACITY:	*150 rds **300 rds respectively
SIGHTING:	Reflex type: gunner/co-pilot operated in elevation and deflection.

COST PER FLYING HOUR:

a. Maintenance:	Not available
b. Repair parts:	Not available

MAINTENANCE AND SUPPLY:

a. Maintenance	Organizational	Direct, General and Depot
Instruction:	TM 9-1010-207-12	Support TM 9-1010-207-35
b. Repair parts:	TM 9-1010-207-12,20P	34P
c. Special tools:	TM 9-1010-207-12,20P	34P
d. Shop sets:	Not Applicable	

2-9. M5 Armament Subsystem, Grenade Launcher (CONT).

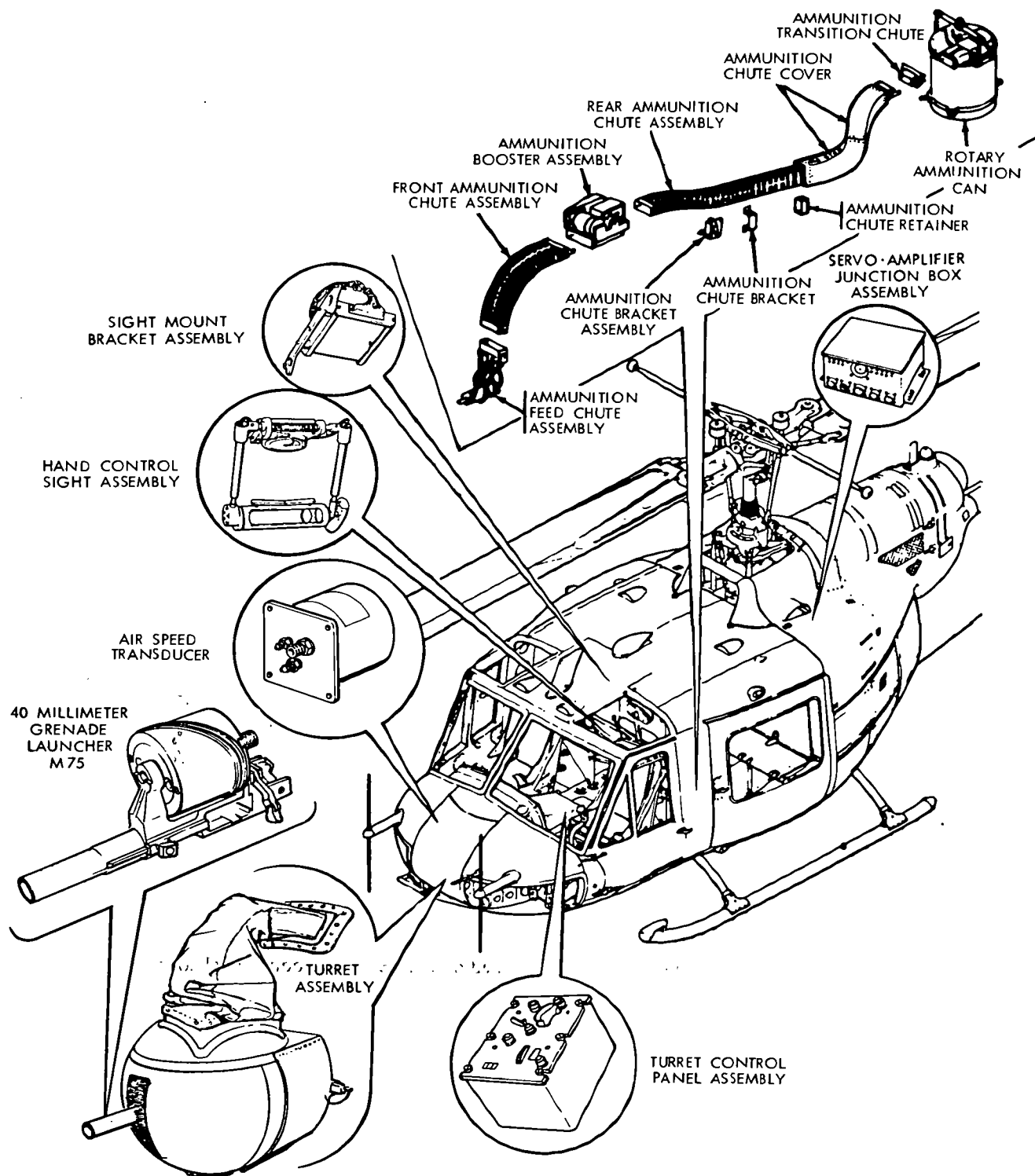
MODIFICATION DATA REQUIRED FOR INSTALLATION, FUNDING, CONTROLS, AND OPERATING INSTRUCTIONS:

<u>KIT</u>	<u>FSN</u>	<u>PUBLICATION</u>	<u>NICP</u>	<u>FUND REQUIREMENTS</u>
A	1560-753-7294	MWO 55-1520-211-34/33	B17	DA Allocated
C	1010-738-5811	TM 9-1010-207-12	B14	DA Allocated
*RAC	1560-936-4334	MWO 55-1520-211-30/32	B17	DA Controlled

Initial issue of kits is DA Controlled and PEMA funded. Repair parts other than initial MWO procurement items are stock funded.

*RAC — Rotary Ammo Can — Required to upgun the M5 subsystem.

Operational instructions for subsystem can be found in TM 66-1520-220 series manual.



AV 012372

Figure 2-5. M5 Armament subsystem components

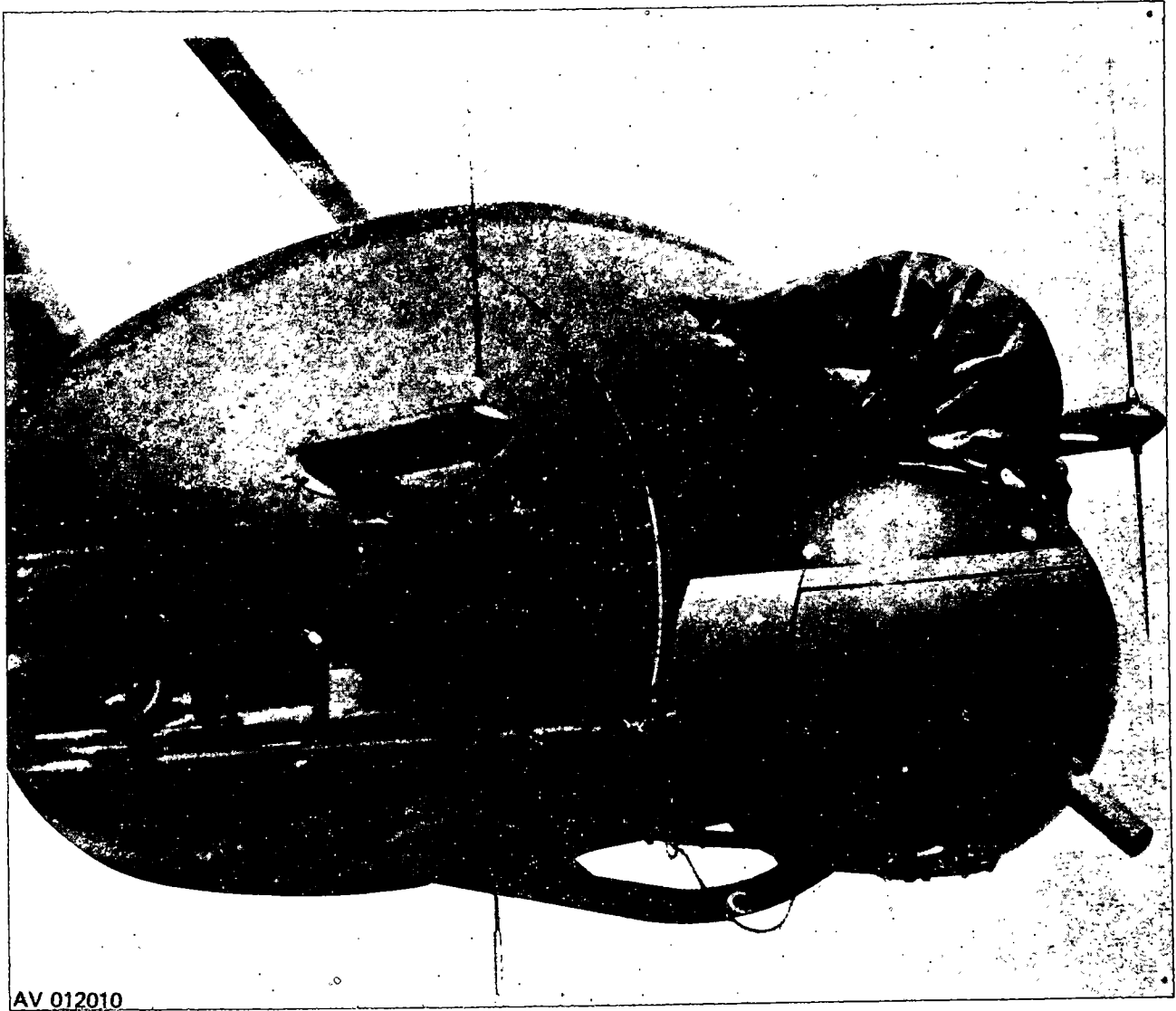


Figure 2-6. M5 Armament subsystem installed on UH-1B/C/M (Iroquois) helicopter

2-10. M18A1 Armament Subsystem.

ARMAMENT SUBSYSTEM: M18A1

APPLICABLE AIRCRAFT TYPE MODEL AND SERIES: Attack helicopter AH-1G

AVERAGE PROCUREMENT PRICE: \$20,070

TYPE CLASSIFICATION: Standard A

NOMENCLATURE: Armament pod, helicopter, 7.62mm machine gun: high-rate

DESCRIPTION: The M18A1 armament pod consists of one 7.62mm automatic gun, M134, in a cylindrical pod mounted on the inboard wing stores of the aircraft. The pod stores 1500 rounds of ammunition in a linkless feed system. The gun is electrically driven at either low rate, 2000 shots per minute, or high rate, 4000 shots per minute. The pod is self-powered by a self contained battery with a power start feature using auxiliary aircraft power for more starting torque. The pod is rigidly mounted and aiming is accomplished by maneuvering the aircraft.

CHARACTERISTICS:

MAXIMUM EFFECTIVE RANGE:	1100 meters
ELEVATION:	Attitude of aircraft
MUZZLE VELOCITY:	2750 FPS
RATE OF FIRE:	2000 or 4000 SPM
TRAVERSE:	Attitude of aircraft
EMPTY WT: 240 lbs	LOADED WT: 320 lbs
AMMUNITION:	
TYPE:	Linked 7.62mm
CAPACITY:	1500 rds
SIGHTING:	M73 Reflex type

COST PER FLYING HOUR:

Maintenance:	not available
Repair parts:	not available

MAINTENANCE AND SUPPLY:

Maintenance instruction:	Organizational TM 9-1005-257-12	Direct, General, and Depot Support TM 9-1005-257-35
Repair parts:	TM 9-1005-257-20P	35P
Special tools	TM 9-1005-257-20P	35 and 35P
Shop sets:	Not Applicable	

MODIFICATION DATA REQUIRED FOR INSTALLATION, FUNDING, CONTROLS, AND OPERATING INSTRUCTIONS:

<u>KIT</u>	<u>FSN</u>	<u>PUBLICATION</u>	<u>NICP</u>	<u>FUND REQUIREMENTS</u>
Chute	1005-118-8739	MWO 9-1005-257-20/1	B14	DA controlled

Initial issue of kit is DA controlled and PEMA funded. Repair parts other than initial MWO procurement items are stock funded.

Operational instructions for subsystem can be found in TM 55-1520-221-10.

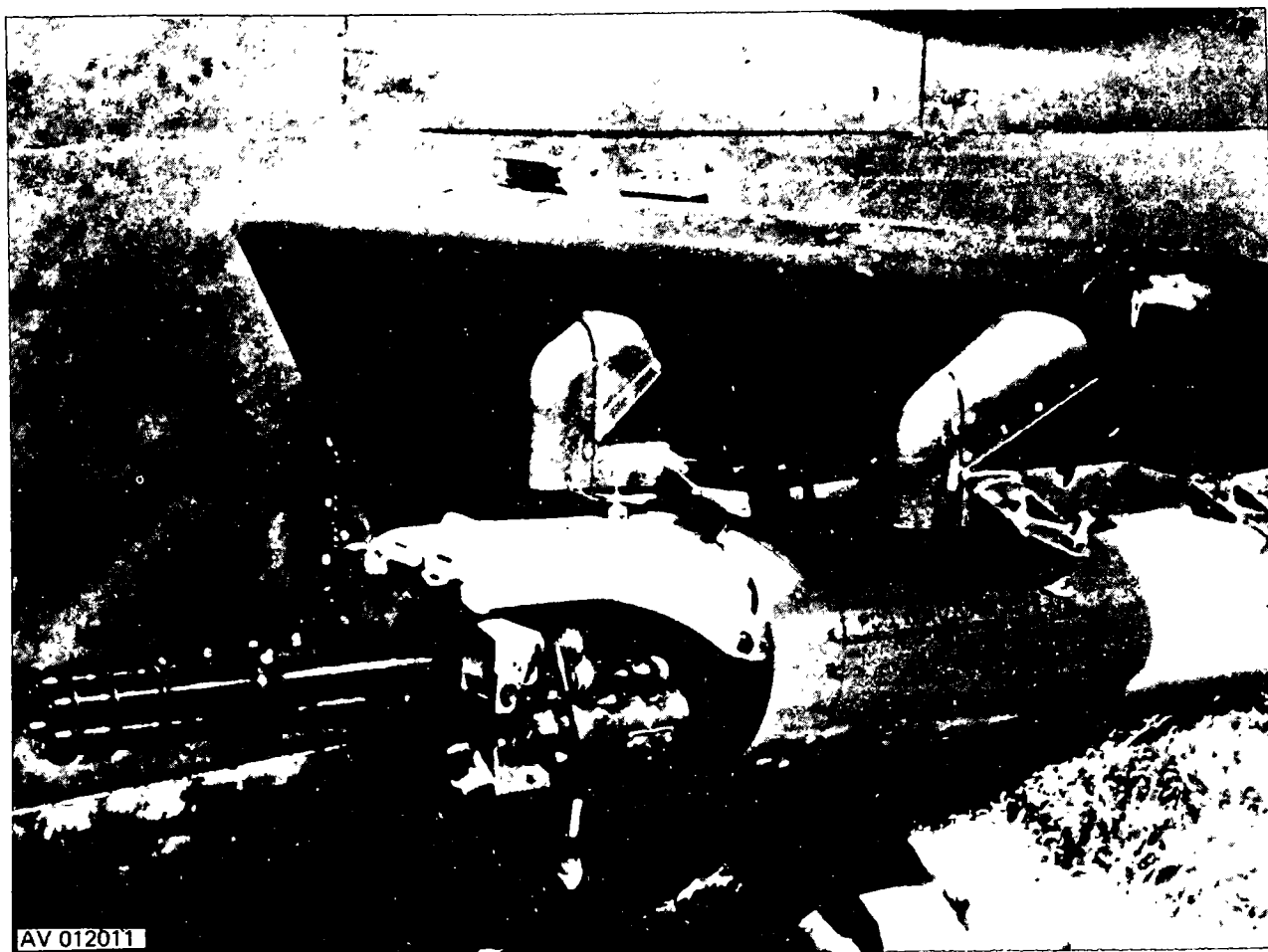


Figure 2-7. M18A1 Armament subsystem

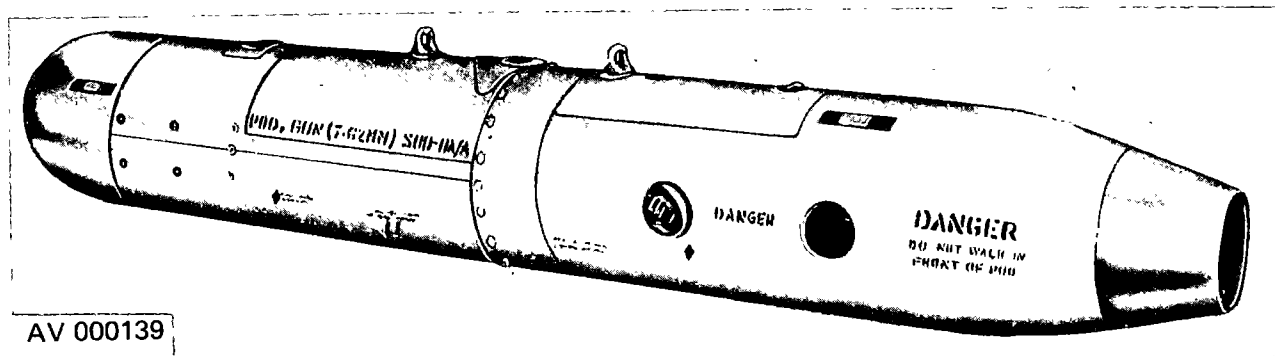


Figure 2-8. M18A1 Armament subsystem

2-11. M21 Armament Subsystem.

ARMAMENT SUBSYSTEM: M21

APPLICABLE AIRCRAFT — TYPE, MODEL, SERIES: Utility aircraft, UH-1B, C, M

AVERAGE PROCUREMENT PRICE: \$32,214

TYPE CLASSIFICATION: Standard A

NOMENCLATURE: Armament subsystem, helicopter, 7.62mm twin high rate machine gun with 2.75 inch rocket launchers.

DESCRIPTION: The M21 armament subsystem combines the 7.62 mm, high rate of fire machine gun M134 and the 2.75 inch Folding Fin Aerial Rocket (FFAR), M158A1 launchers. The subsystem consists of two remotely controlled, power operated, flexible pylons, each mounting one 7.62mm machine gun M134 and provisions for a non-flexible rocket pod containing seven 2.75 inch FFAR. The rocket launcher installation on each pylon contains associated hardware to fire the rockets and to jettison the launcher. Linked 7.62mm ammunition is stowed inboard and transported to the guns through flexible chuting. A flexible sighting system enables the copilot to remotely aim and fire the machine guns. The pilot may fire either the rockets or the machine guns when in stow position using a fixed sight. The subsystem utilizes all standard 7.62mm NATO ammunition and 2.75 inch rockets applicable to the M158A1 launcher.

CHARACTERISTICS:

MAXIMUM EFFECTIVE RANGE:

Machine Gun: 1100 meters

Rocket: 3000 meters

RATE OF FIRE:

MUZZLE VELOCITY:

TRAVERSE:

SIGHTING:

EMPTY WEIGHT: 804 lbs

AMMUNITION:

TYPE:

CAPACITY:

ROCKETS:

TYPE:

ELEVATION DEPRESSION:

Machine Gun: +10° to -85°

Rocket Launcher: Boresight only

2000 or 4000 SPM

2750 FPS

Machine guns, inboard 12°, outboard 70° in azimuth from longitudinal axis

Pilot-manual reflex type for machine gun and rocket. Copilot/gunner flexible reflex type sight for machine gun only

LOADED WEIGHT: 1179.2 lbs

Linked 7.62MM

6000 rds

2.75 inch FFAR

2-11. M21 Armament Subsystem (CONT).

ITEM	WEIGHT	LENGTH
MOTOR MK40 & MODS	11.22 lb	39.30 in
WARHEAD M151	8.70 lb	10.40 in
WARHEAD M229	16.10 lb	20.40 in
FUZE M423	.62 lb	3.11 in
M429	.90 lb	5.02 in

I	2.75 Inch FFAR WT-28.22# LG-64.72 in CG-26.90 in
II	2.75 Inch FFAR WT-27.94# LG-62.81 in CG-25.35 in
III	2.75 Inch FFAR WT-20.82# LG-54.72 in CG-23.10 in
IV	2.75 Inch FFAR WT-20.54# LG-52.81 in CG-21.60 in

LAUNCHERS:
TYPE:

7 tube

LAUNCHER	EMPTY				LOADED M229 WARHEAD				LOADED M151 WARHEAD			
	WT	LG	DIA	CG	M429	Fuze	M423	Fuze	M429	Fuze	M423	Fuze
	LBS	IN	IN		WT	CG	WT	CG	WT	CG	WT	CG
M158A1	48.0	58.0	9.9	30.1	245.5	22.1	243.6	22.4	193.7	27.3	191.8	27.6

2-11. M21 Armament Subsystem (CONT).**COST PER FLYING HOUR:**

MAINTENANCE – Not available

REPAIR PARTS – Not available

MAINTENANCE AND SUPPLY:

Maintenance	Organizational:	Direct, General, and Depot
Instruction:	TM 9-1090-202-12	Support TM 9-1090-202-35
Repair Parts:	TM 9-1090-202-20P	-34P*
Special Tools:	TM 9-1090-202-20P	-34P*
*To be published		

MODIFICATION DATA REQUIRED FOR INSTALLATION, FUNDING, CONTROLS, AND OPERATING INSTRUCTIONS:

<u>KIT</u>	<u>FSN</u>	<u>PUBLICATION</u>	<u>NICP</u>	<u>FUND REQUIREMENT</u>
A	1560-915-8931	MWO 55-1520-211-30/8	B17	DA Allocated
B	1560-915-8933	TM 55-1520-211-20/5	B17	DA Allocated
C	1090-923-5971	TM 9-1090-202-12	B14	DA Allocated
	*1560-923-3182	MWO 55-1520-211-30/12	B17	Free Issue

Initial issue of kits is DA Allocated, DA Controlled, and PEMA funded. Repair parts other than initial MWO procurement items are stock funded.

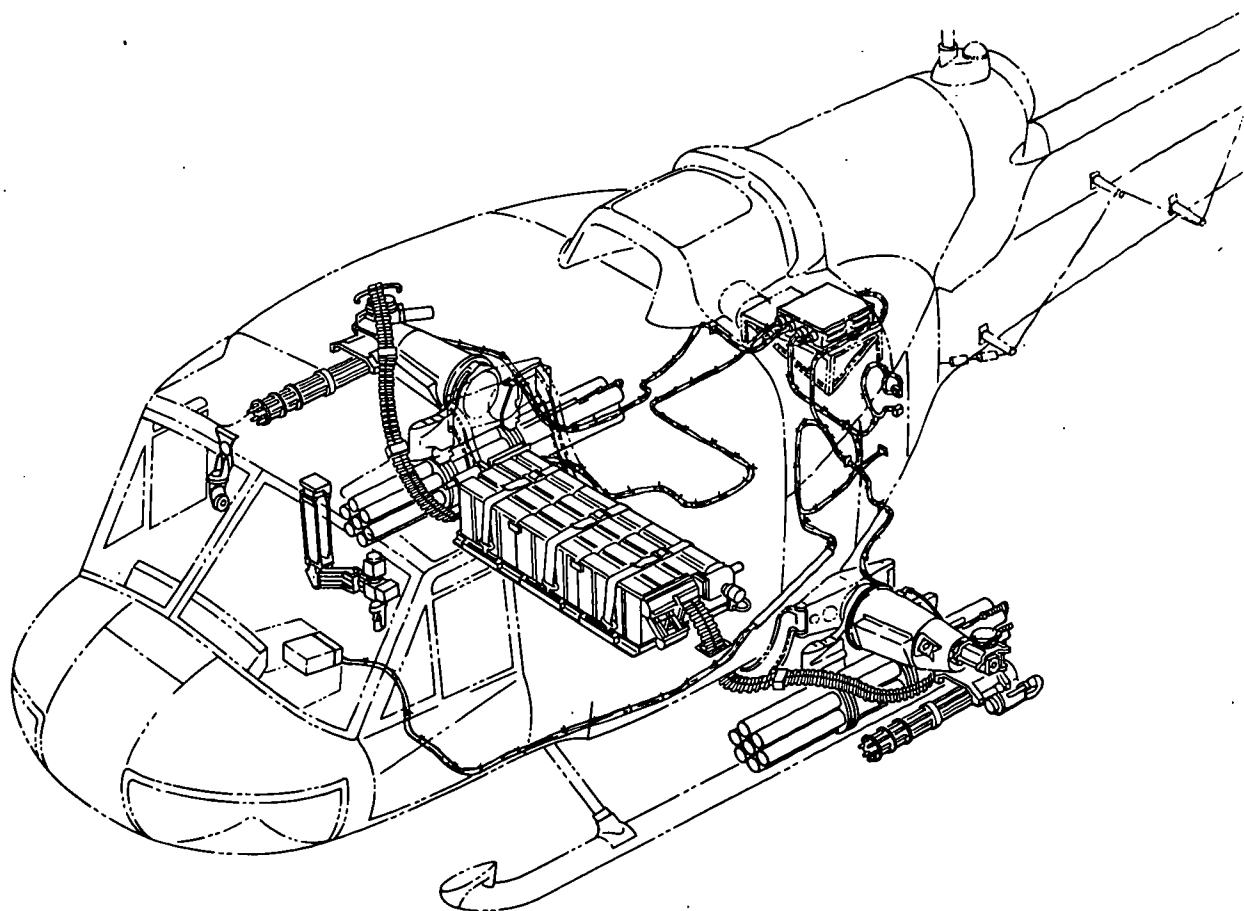
Operational instructions for subsystem can be found in TM 55-1520-220 series manual.

*Sight Stow Bracket required if not previously installed.

In addition to the above, these modifications can be installed only in aircraft which have the following provisions:

M3/M6 "A" Kit, FSN 1560-960-4043, publication MWO 55-1520-221-40/4, NICP B17, DA Allocated M16 "A" Kit, FSN 1560-918-7007, publication MWO 55-1520-211-30/4, NICP B17, DA Allocated

Initial issue of rocket launchers, M158A1, FSN 1055-805-0689, is provided with subsystem. Replacement tubes should be requisitioned. No funds required.



AV 000140

Figure 2-9. M21 Armament subsystem installed on UH-1B/C/M (Iroquois) helicopter

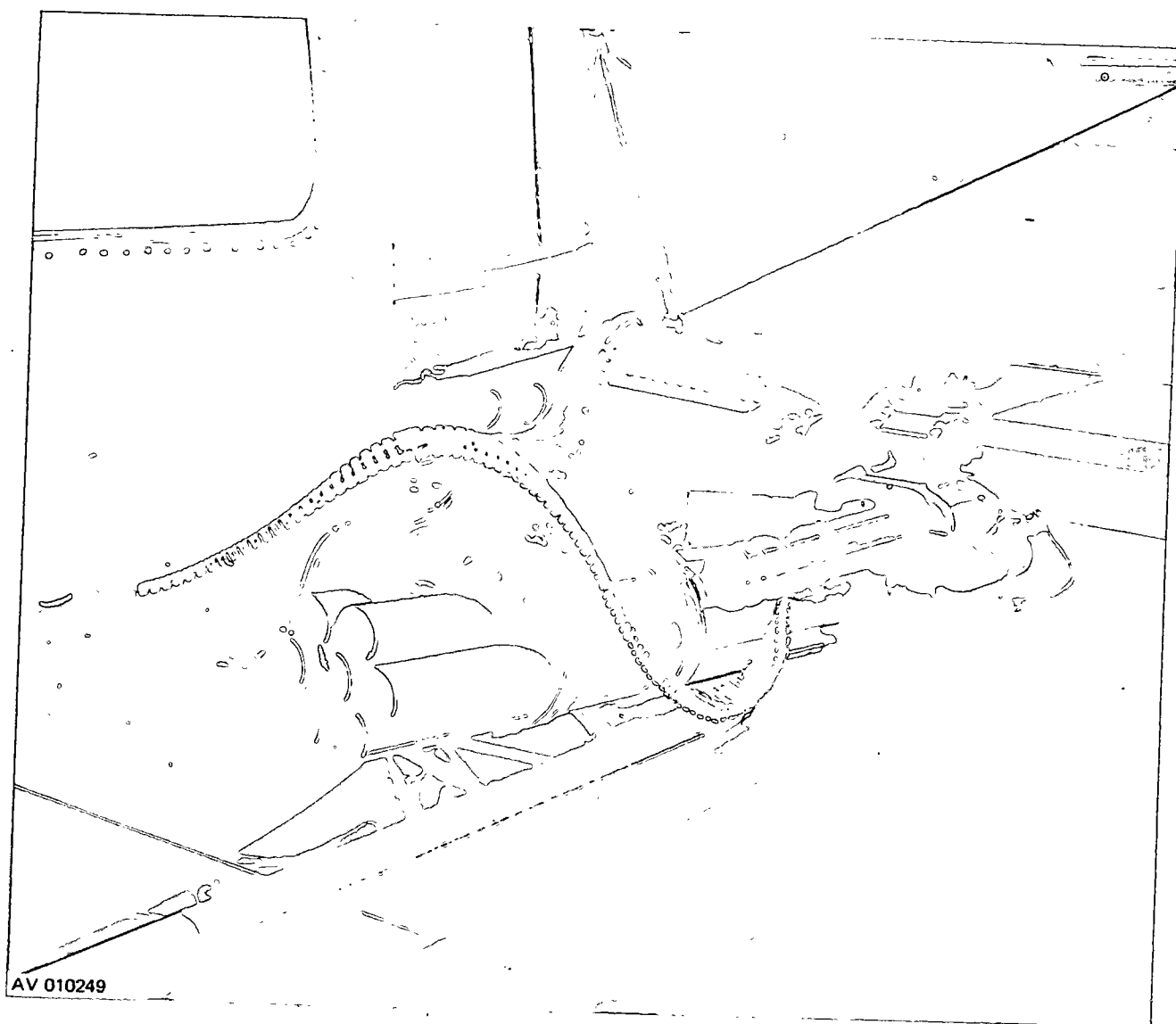


Figure 2-10. M21 Armament subsystem installed on UH-1B/C/M (Iroquois) helicopter

2-14. M27 Armament Subsystem.**ARMAMENT SUBSYSTEM: M27**

APPLICABLE AIRCRAFT – TYPE, MODEL, SERIES: OH-6A, OH-58A

AVERAGE PROCUREMENT PRICE: \$17,579

TYPE CLASSIFICATION: B

NOMENCLATURE: Armament subsystem, helicopter, 7.62mm machine gun; high rate M27

DESCRIPTION: The M27 armament subsystem mounts the high rate of fire 7.62mm machine gun M134. The subsystem consists of a single, remote controlled, semi-flexible mount which supports the machine gun, M134, on the left (port) side of the OH-6 and OH-58 helicopters. Linked 7.62mm ammunition is stored inboard and transported to the gun through fixed chuting. A flexible, mechanically linked sighting system enables the pilot to remotely aim and fire the machine gun. The weapon subsystem is flexible in elevation and depression only, being fixed in azimuth. The aircraft must be aimed by the pilot for target engagement. The armament subsystem is adaptable to the helicopter by means of quick release attachments. Complete internal provisions are incorporated in the production aircraft to accept the armament subsystem without modifications. The weapons subsystem complements weapon systems currently employed in the field.

CHARACTERISTICS:

MAXIMUM EFFECTIVE RANGE:	1100 meters
ELEVATION/DEPRESSION:	OH-6A +10°, to -24° OH-58A +5 1/2° to -20°
MUZZLE VELOCITY:	2750 FPS
RATE OF FIRE:	2000 or 4000 SPM
TRAVERSE:	None
EMPTY WT: 100 lbs	LOADED WT: 234 lbs
AMMUNITION:	
CAPACITY:	2000 rds.
TYPE:	Linked 7.62mm
SIGHTING:	Pilot M70 reflex type

COST PER FLYING HOUR:

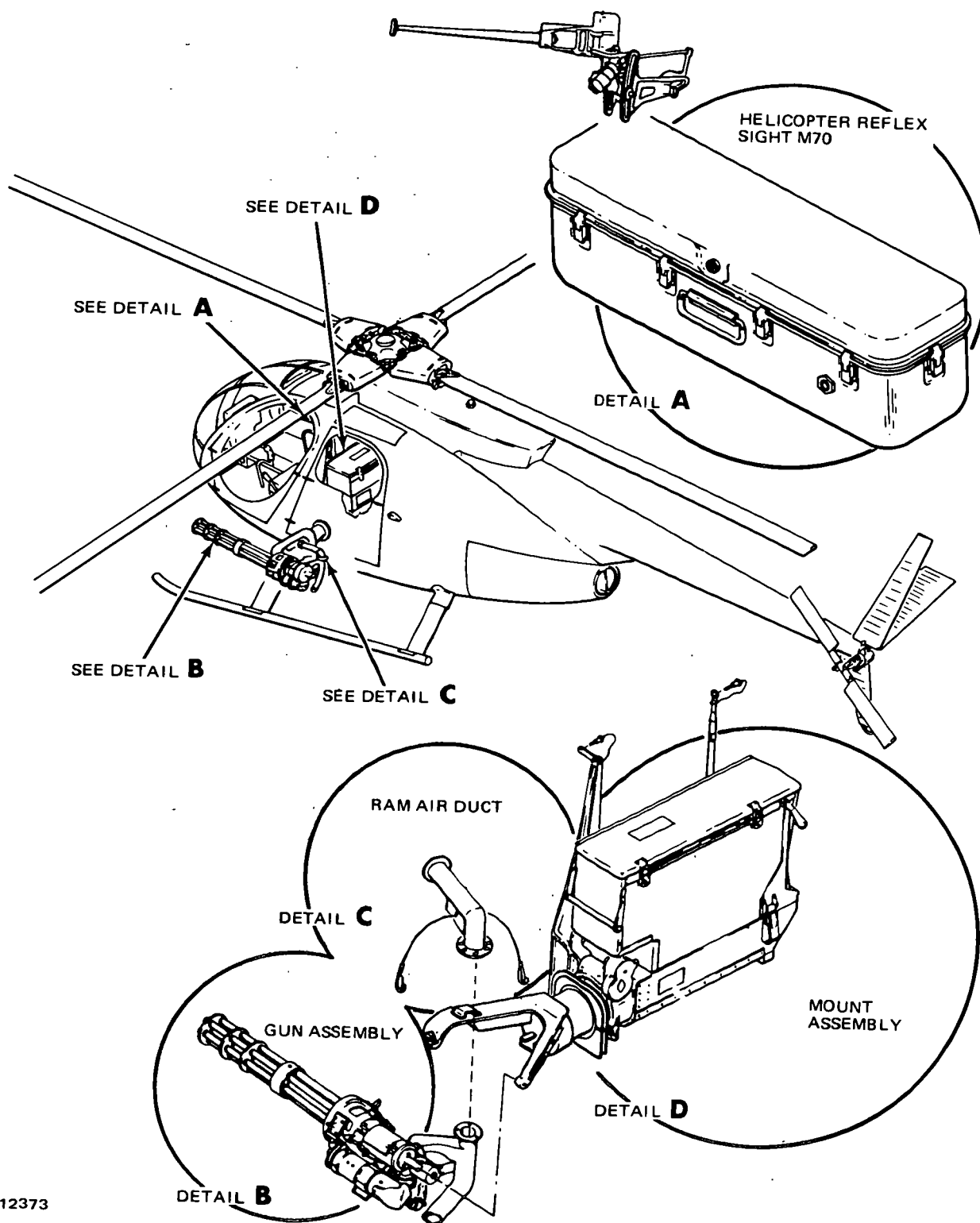
Maintenance:	Not available.
Repair parts:	Not available.

MAINTENANCE AND SUPPLY:

Maintenance	Organizational	Direct and General Support
Instruction:	TM 9-1005-298-12	-35
Repair parts:	TM 9-1005-298-20P	-35P
Special tools:	TM 9-1005-298-20P	-35P
Shop sets:	Not Applicable	

MODIFICATION DATA REQUIRED FOR INSTALLATION, FUNDING, CONTROLS, AND OPERATING INSTRUCTIONS:

<u>KIT</u>	<u>FSN</u>	<u>PUBLICATION</u>	<u>NICP</u>	<u>FUND REQUIREMENT</u>
C	1005-933-6242	TM 9-1005-298-12	B14	DA Allocated

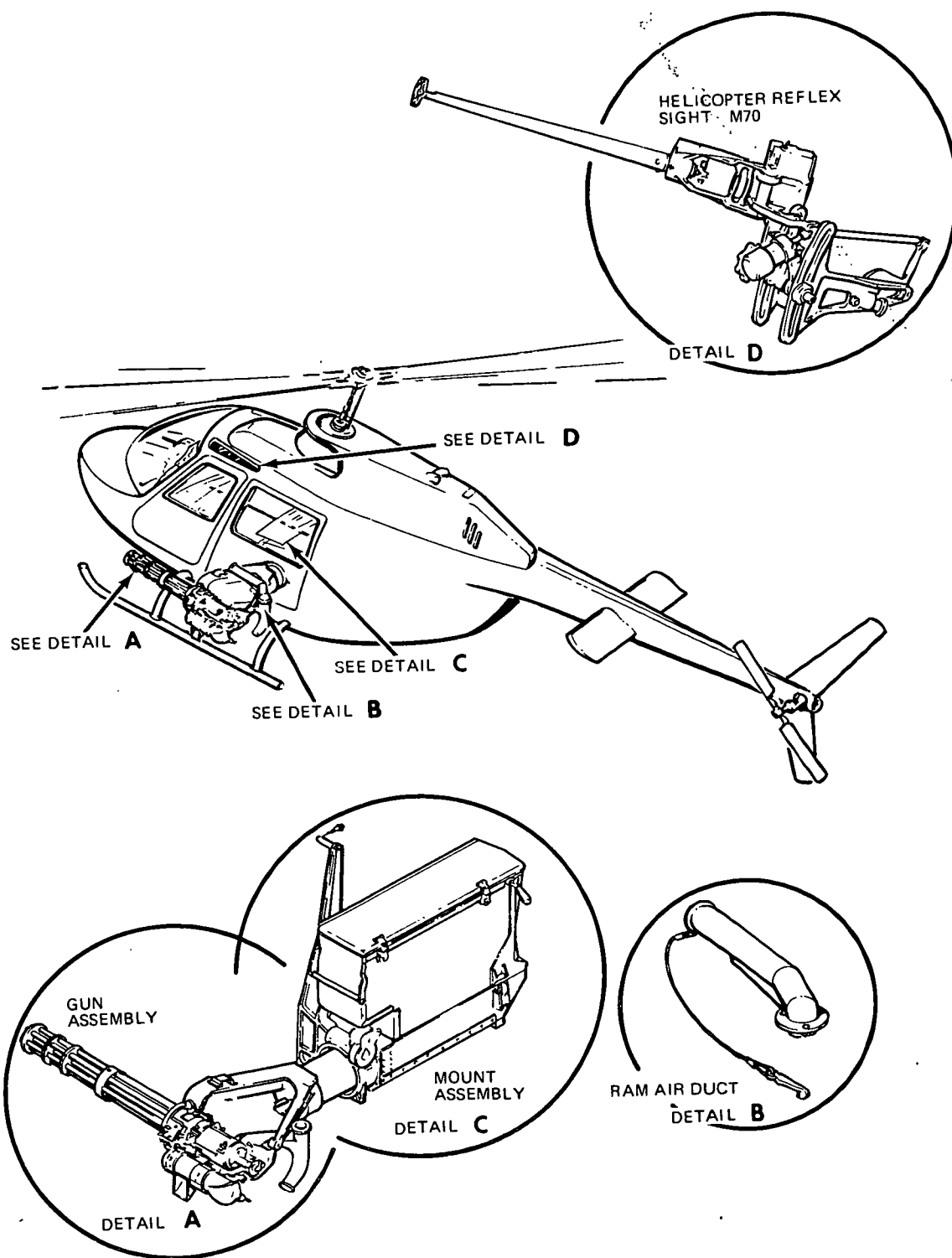


AV 012373

Figure 2-15. M27 Armament system components (OH-6A application)

2-66

NOTE: This weapons configuration for OH6A is in "hold" status. DA has not approved it. As of 20Dec73.



AV 012015

Figure 2-16. M27 (OH-58A application)

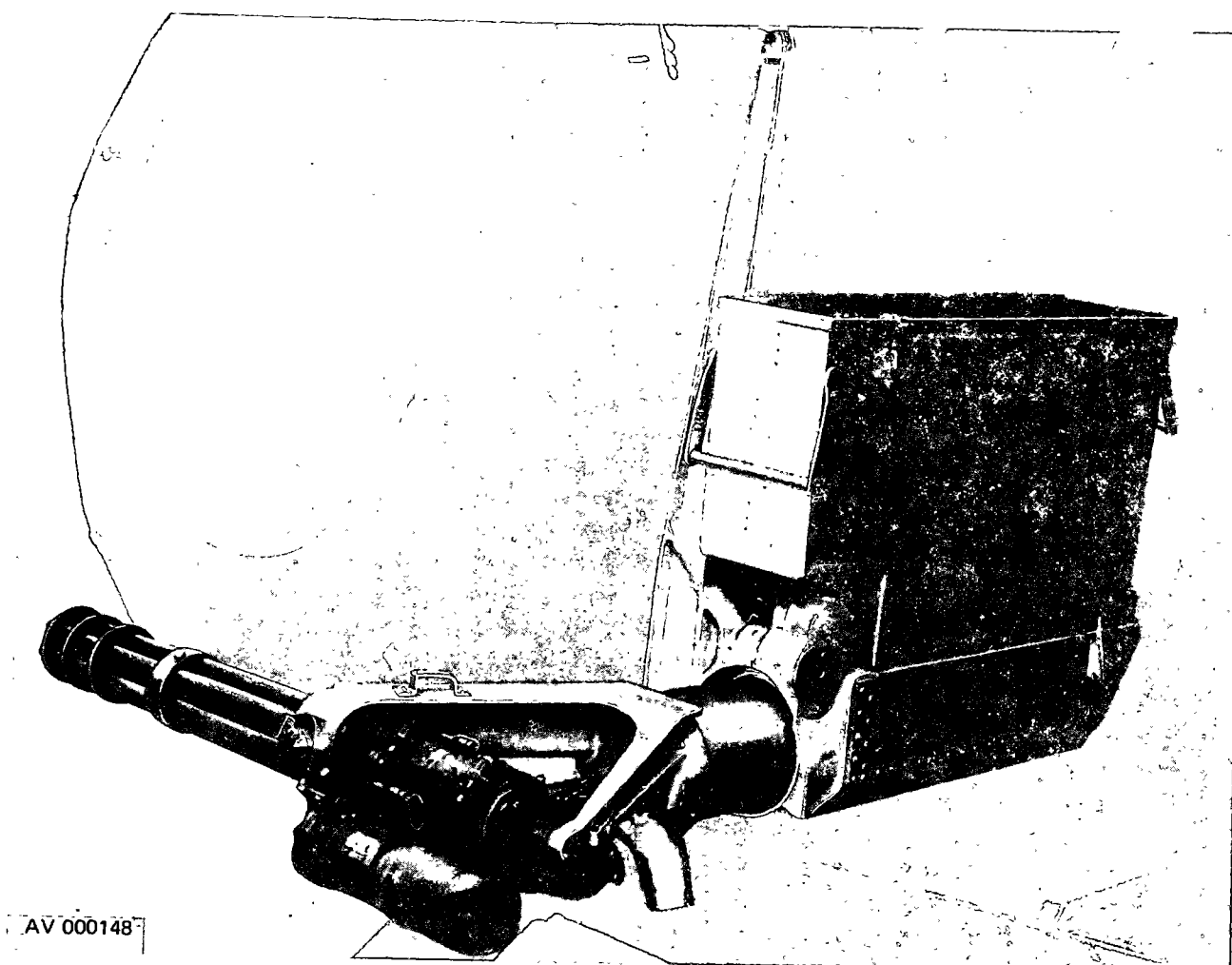


Figure 2-17. M27 Armament subsystem

2-15. M28A1 Armament Subsystem.

ARMAMENT SUBSYSTEM: M28A1
 APPLICABLE AIRCRAFT – TYPE, MODEL, SERIES: AH-1G
 AVERAGE PROCUREMENT PRICE: \$60,000
 TYPE CLASSIFICATION: Standard A

NOMENCLATURE: Armament subsystem, helicopter, 7.62mm machine gun, 40mm grenade launcher.

DESCRIPTION: The M28A1 armament subsystem is an electrically controlled, hydraulically operated, dual weapon that provides wide angle coverage and rapid fire for the AH-1G Hueycobra. The M28A1 armament subsystem consists of a power operated chin turret, mounting either one 7.62mm machine gun M134, one 40mm grenade launcher M129, or two of each. Ammunition is stored in the ammunition bay and moved to the turret through fixed and flexible chuting. Fire control equipment is located at the gunner/co-pilot station and allows the gunner to train the weapons in azimuth and elevation. Provisions are made for the pilot to fire the weapons in the stow position. The subsystem is adaptable to the AH-1G helicopter by means of quick release attachments. Complete internal provisions are incorporated in production aircraft to accept the armament subsystem. The system provides the AH-1G Hueycobra with area and point fire for attack on personnel and lightly armored and unarmored materiel targets during escort and armed reconnaissance missions.

CHARACTERISTICS:

MAXIMUM EFFECTIVE RANGE: 7.62mm 1100 meters; 40mm 1500 meters			
ELEVATION/DEPRESSION: +20° - 50° variable with traverse			
MUZZLE VELOCITY: Machine gun 2750 FPS 40mm Grenade launcher 790 FPS			
RATE OF FIRE: 7.62mm - 2000 or 4000 SPM, 40mm - 420 SPM			
TRAVERSE: 110° left and right of longitudinal axis of AH-1G			
EMPTY WT:	7.62mm and 40mm	447 lbs	LOADED WT: 897 lbs
	TWIN 40mm	490 lbs	880 lbs
	TWIN 7.62mm	391 lbs	901 lbs
AMMUNITION:			
CAPACITY: Maximum 4000 rds for each M134, 300 rds for each M129.			
TYPE: Linked 7.62mm and 40mm.			
SIGHTING: Reflex sight M73, lighted reticle, flexible with automatic air-speed compensation and manual range adjustment.			

COST PER FLYING HOUR:

Maintenance:	Not available
Repair parts:	Not available

2-15. M28A1 Armament Subsystem (CONT).

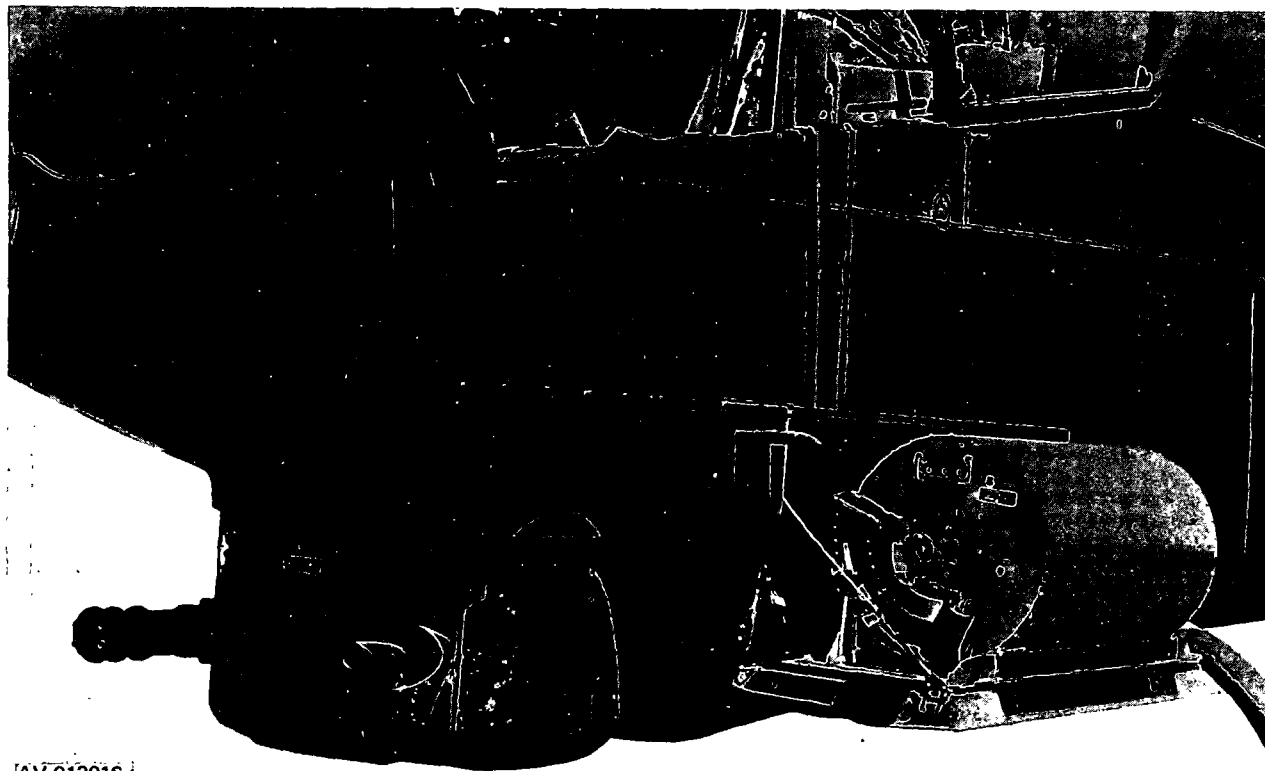
MAINTENANCE AND SUPPLY:

Maintenance	Organizational	Direct, General and Depot support
Instruction:	TM 9-1090-203-12;	-35
Repair parts:	TM 9-1090-203-20P;	-35P
Special tools:	TM 9-1090-203-12 and 20P;	-35 and -35P
Shop sets:	Not Applicable	Not Applicable

MODIFICATION DATA REQUIRED FOR INSTALLATION, FUNDING, CONTROLS, AND OPERATING INSTRUCTIONS:

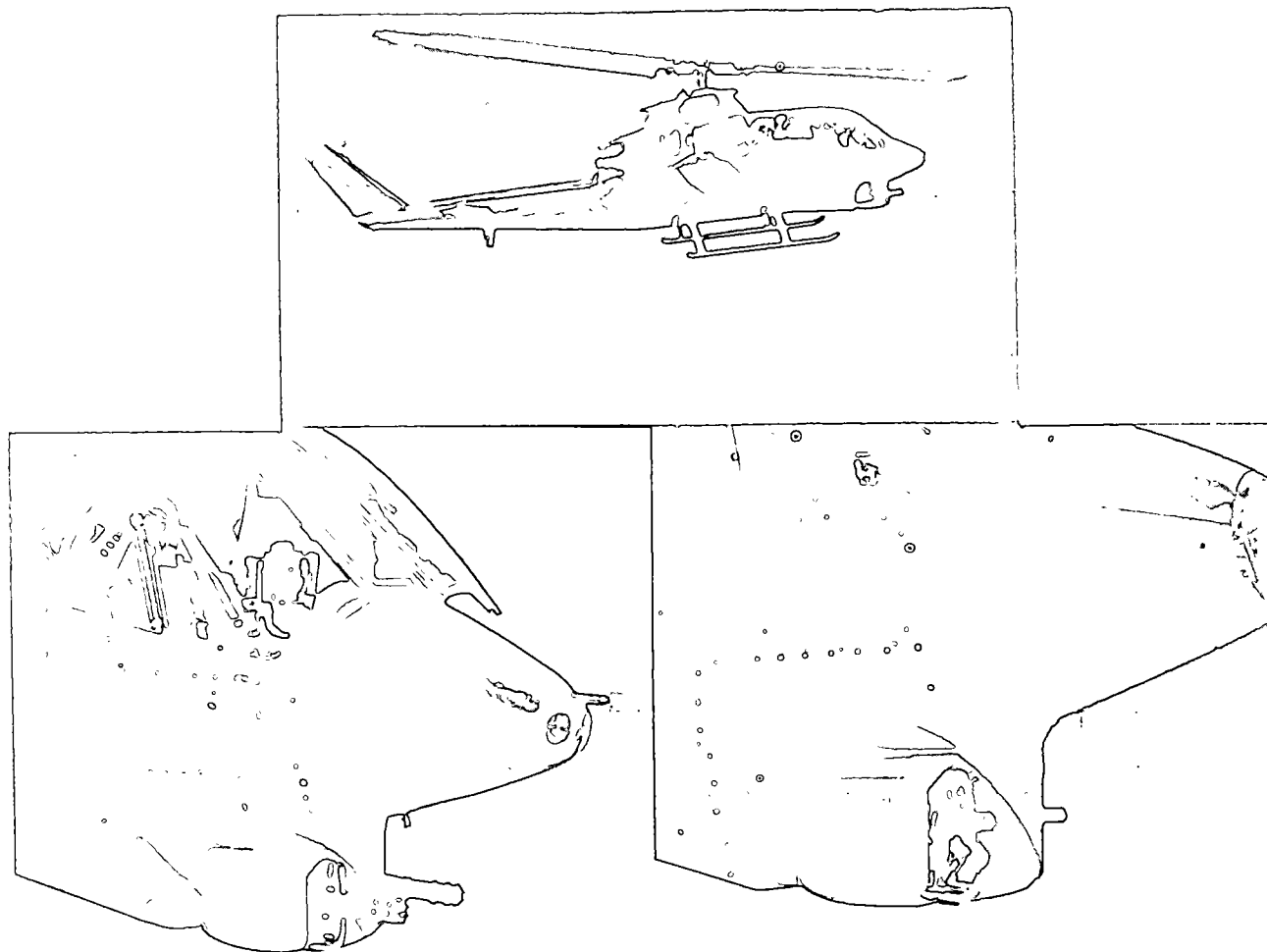
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—	1090-134-3071	TM 9-1090-203-12	B14	DA Controlled

Operation instructions are contained in TM 55-1520-221-10.



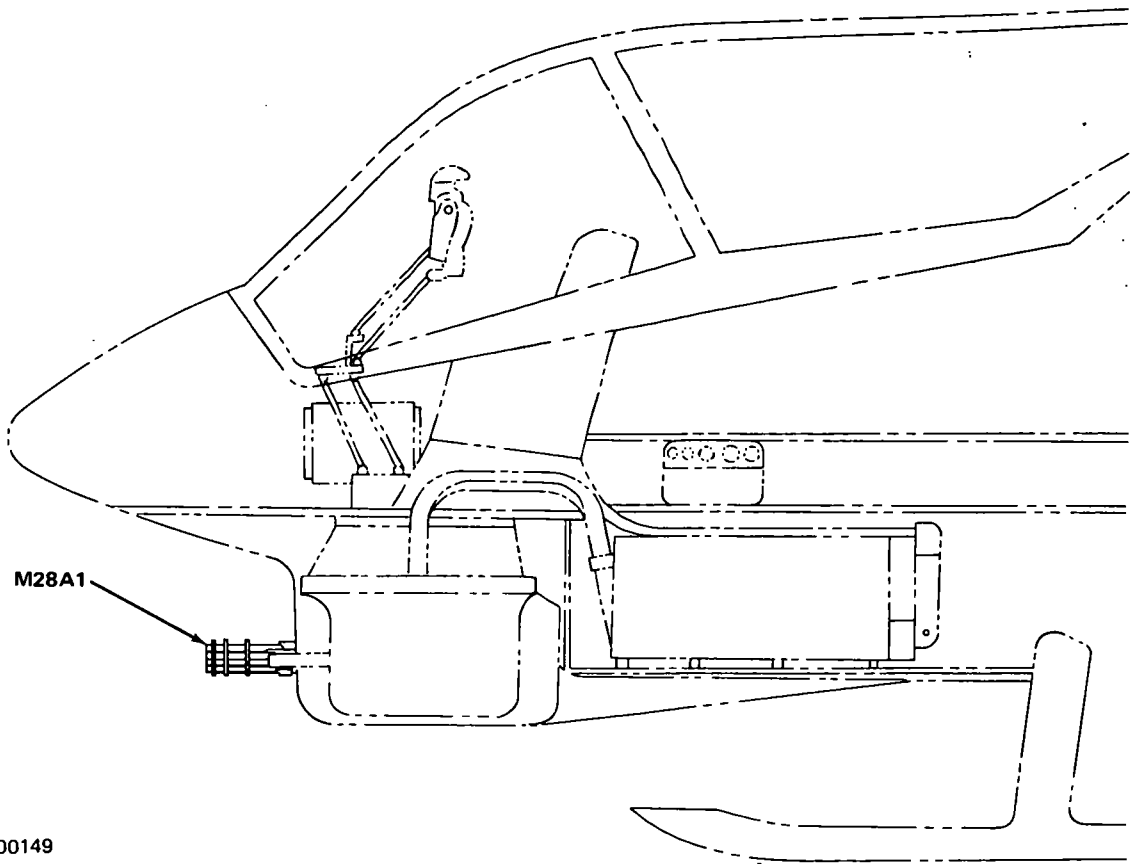
AV 012016

Figure 2-18. M28A1 Armament subsystem



AV 012017

Figure 2-19. M28A1 Armament subsystem



AV 000149

Figure 2-20. M28A1 Armament subsystem

2-16. M35 Armament Subsystem.

ARMAMENT SUBSYSTEM: M35
 APPLICABLE AIRCRAFT – TYPE, MODEL, SERIES: AH-1G
 AVERAGE PROCUREMENT PRICE: \$44,865
 TYPE CLASSIFICATION: Standard B

NOMENCLATURE: Armament subsystem helicopter, M35

DESCRIPTION: The M35 Subsystem has a 20mm Gatling type gun mounted on the inboard station of the left hand wing. The gun is basically a modified M61A1 gun with shorter barrels and a declutching feeder. It is designated the 20mm automatic gun, M195. It automatically clears itself of all live rounds at the end of each burst without dumping live rounds overboard. The gun is a fixed mount and is pilot controlled. Controls are provided for the co-pilot/gunner to fire the weapon, if necessary. Two ammunition cans (one on either side) are faired into the fuselage at the base of the stub wings.

CHARACTERISTICS:

EFFECTIVE RANGE:	3000 meters
ELEVATION:	Attitude of aircraft
MUZZLE VELOCITY:	3380 FPS
RATE OF FIRE:	650-850 SPM
TRAVERSE:	Attitude of aircraft
EMPTY WT: 555 lbs (approx)	LOADED WT: 1187 lbs (approx)
AMMUNITION:	
CAPACITY:	950 rds
TYPE:	Linked 20mm – M56 HEI and XM220 TPT
SIGHTING:	M73 reflex type

COST PER FLYING HOUR:

Maintenance:	Not available
Repair parts:	Not available

MAINTENANCE AND SUPPLY:

	Maintenance	Organizational	Direct, General, and Depot Support
Instruction:		TM 9-1005-299-12	TM 9-1005-299-34
Repair parts:		TM 9-1005-299-20P	-35P*
Special tools:		TM 9-1005-299-20P	-34 and -35P*
Shop sets:		Not Applicable	

MODIFICATION DATA REQUIRED FOR INSTALLATION, FUNDING, CONTROLS, AND OPERATING INSTRUCTIONS:

<u>KIT</u>	<u>FSN</u>	<u>PUBLICATION</u>	<u>NICP</u>	<u>FUND REQUIREMENT</u>
A	1560-246-4744	MWO 55-1520-221-40/4	B17	COBRA Product
C	1005-133-8193	TM 9-1005-299-12	B14	Manager (AMCPM-CO)

Operational instructions are contained in TM 55-1520-221-10.

*To be published as a -34P

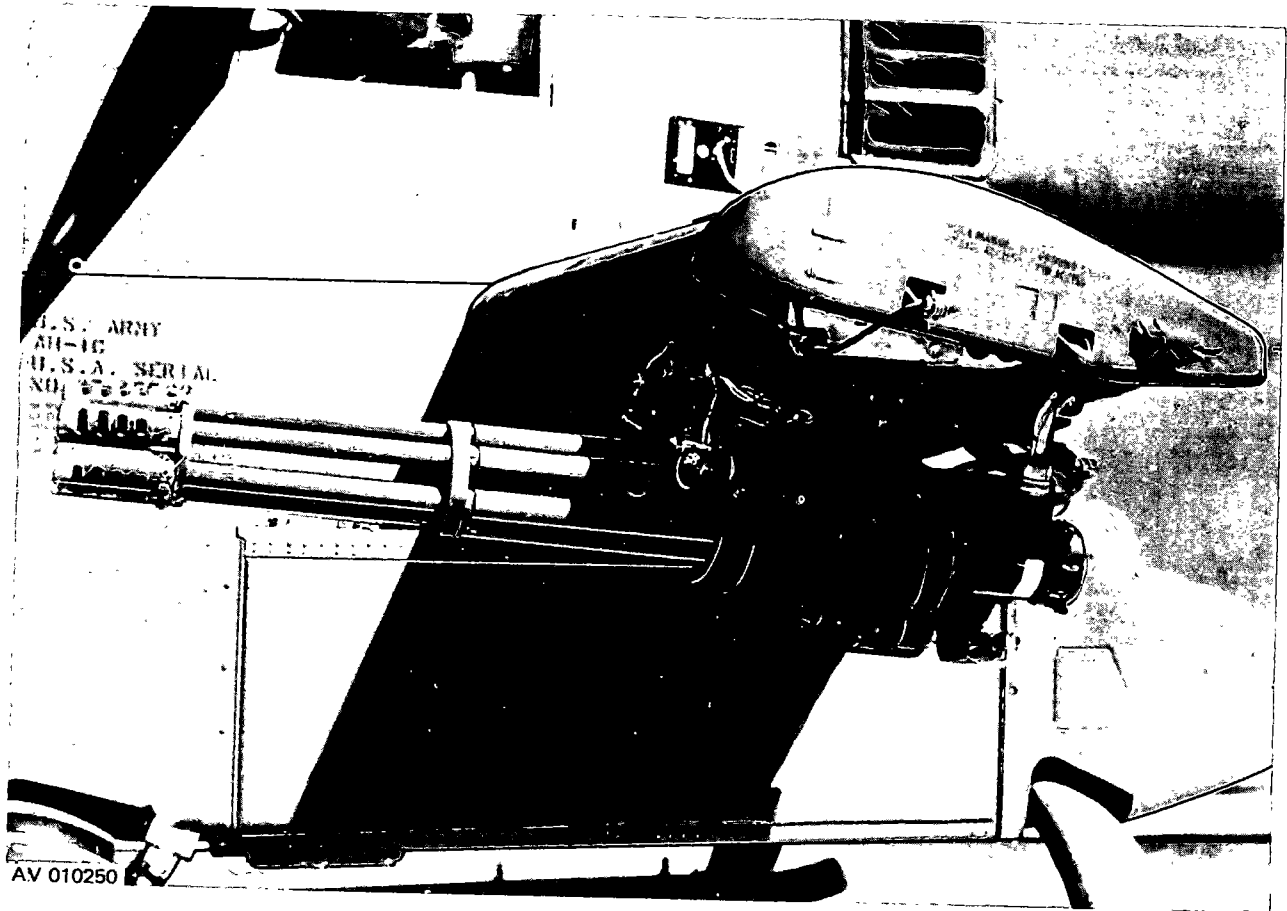


Figure 2-21. M35 Armament subsystem

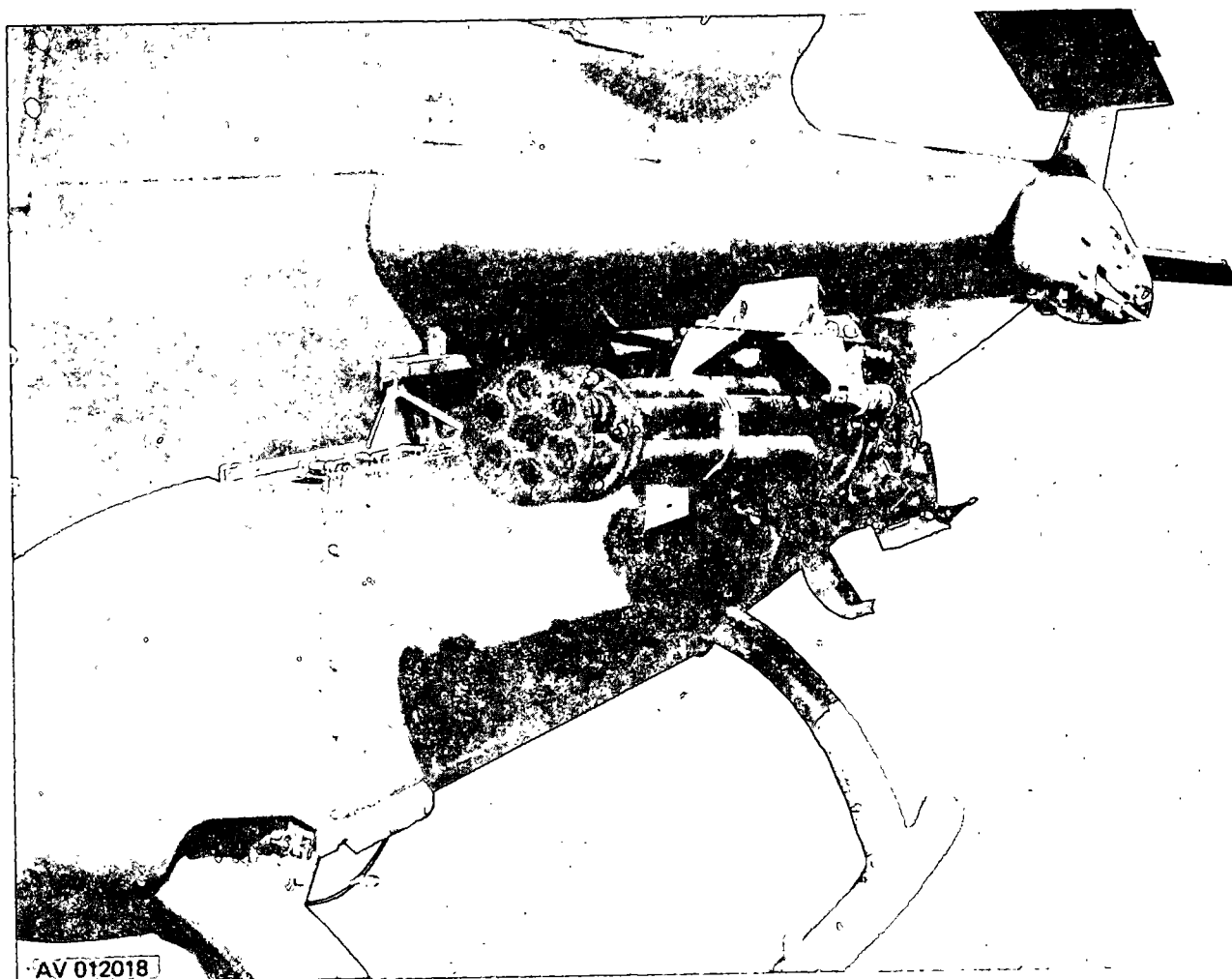


Figure 2-22. M35 Armament subsystem

2-17. M41 Armament Subsystem.**ARMAMENT SUBSYSTEM:** M41**APPLICABLE AIRCRAFT – TYPE, MODEL, SERIES:** CH-47A/B/C**AVERAGE PROCUREMENT PRICE:** \$1,875**TYPE CLASSIFICATION:** Standard A

NOMENCLATURE: Armament subsystem, helicopter, 7.62mm machine gun M60D, ramp mounted, light weight.

DESCRIPTION: The M41 armament subsystem consists of a pintle mount, machine gun M60D, link and brass retainer, ammo box, and gunner's safety harness. The machine gun M60D, is utilized with positive mechanical stops to limit weapon attitude.

CHARACTERISTICS:

MAXIMUM EFFECTIVE RANGE: 1100 meters
ELEVATION/DEPRESSION: +12.5°, -69°
MUZZLE VELOCITY: 2750 FPS
RATE OF FIRE: 550 SPM cyclic rate
TRAVERSE: 52° right or left
WEIGHT: 41 lbs empty, 55 lbs loaded
AMMUNITION:
CAPACITY: 200 rds
TYPE: Linked 7.62mm
SIGHTING: Aircraft ring and post type

COST PER FLYING HOUR:

Maintenance: Not available
Repair parts: Not available

MAINTENANCE AND SUPPLY:

Maintenance: Organizational, Direct, General and Depot Support.
Instruction: TM 9-1005-262-15
Repair parts: TM 9-1005-262-24P
Special tools: TM 9-1005-262-24P
Shop sets: Not Applicable

MODIFICATION DATA REQUIRED FOR INSTALLATION, FUNDING, CONTROLS, AND OPERATING INSTRUCTIONS:

<u>KIT</u>	<u>FSN</u>	<u>PUBLICATION</u>	<u>NICP</u>	<u>FUND REQUIREMENT</u>
C	1005-087-2046	TM 9-1005-262-24P	B14	DA Allocated

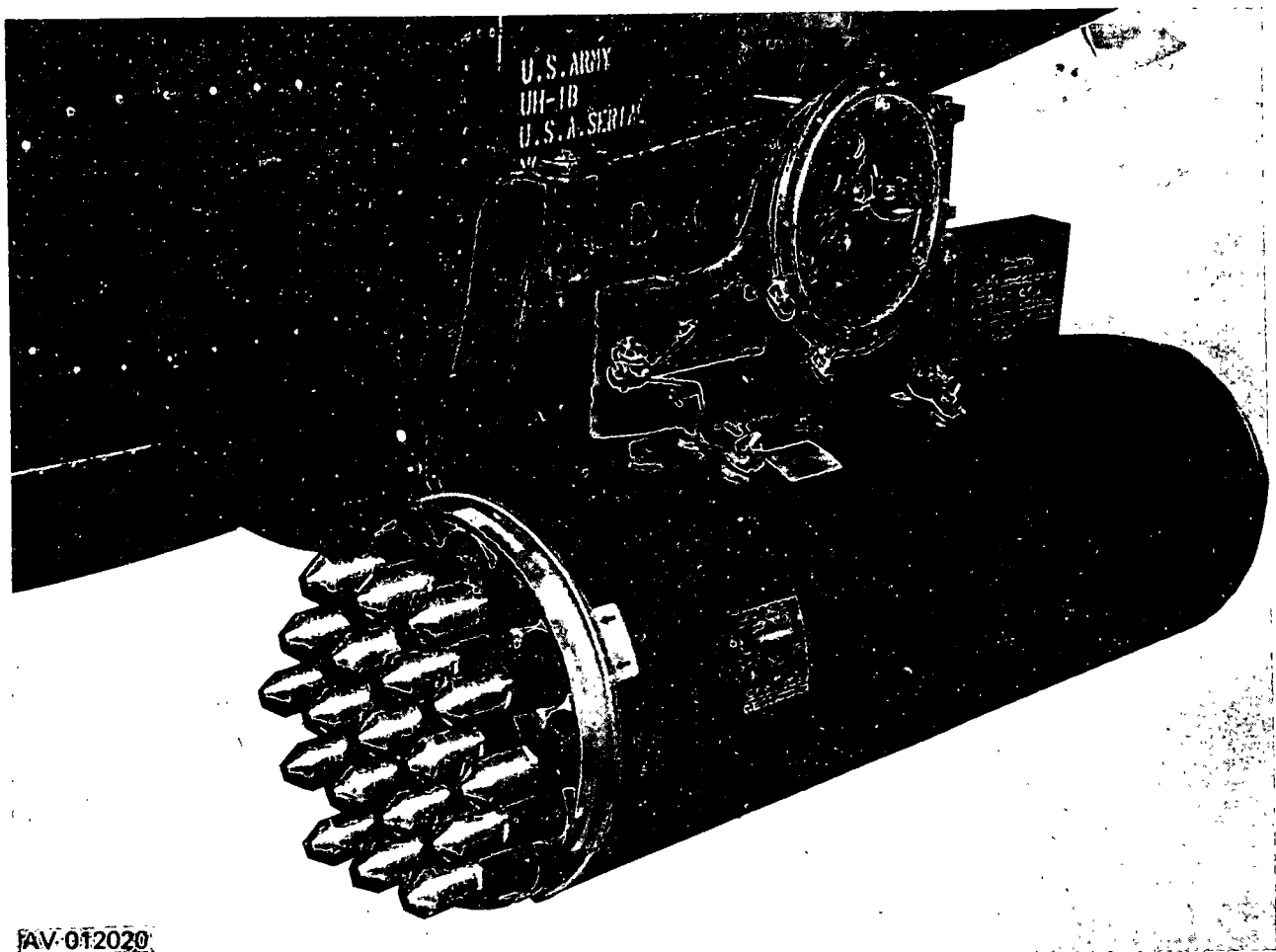
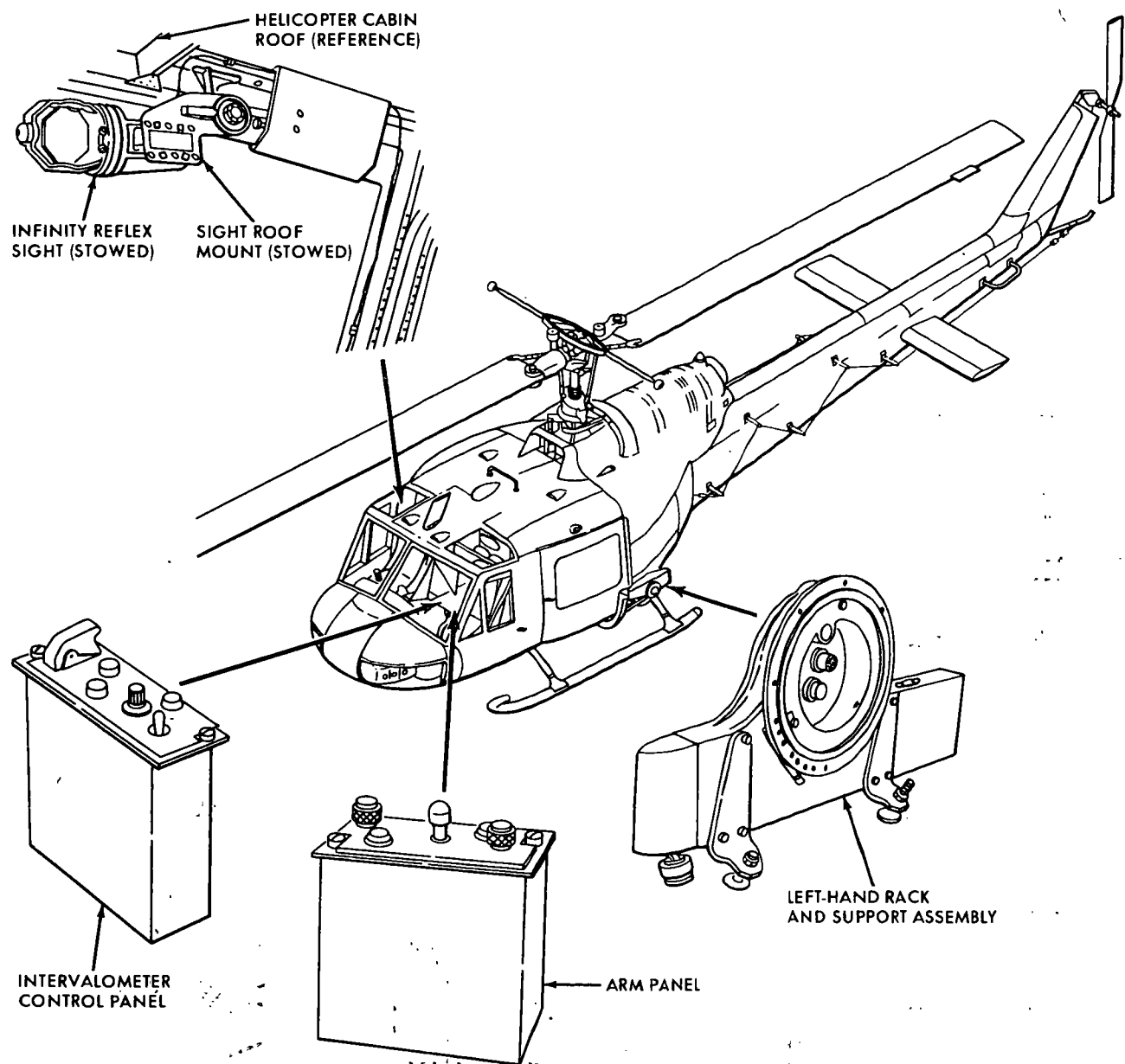


Figure 2-27. XM156 Armament subsystem (Shown with M200A1 rocket launcher)



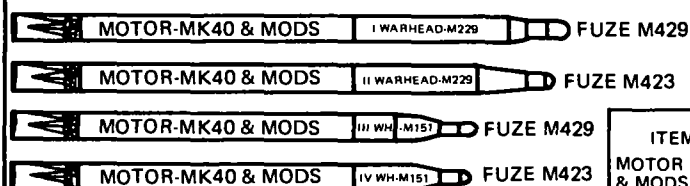
AV 000152

Figure 2-28. XM156 Armament subsystem components

2-20. Aircraft Rocket Launcher and Rocket Application.

2.75" FFAR ROCKET LAUNCHERS AIRCRAFT APPLICATION				
	UH-1B/C/M		AH-1G	
XM157B	X*		X*	* REPLACED BY M158A1
M158A1	X		X	
XM159C	X*		X*	* REPLACED BY M200A1
XM200	X*		X*	* REPLACED BY M200A1
M200A1	X		X	

2.75 INCH ROCKETS AND ROCKET LAUNCHERS

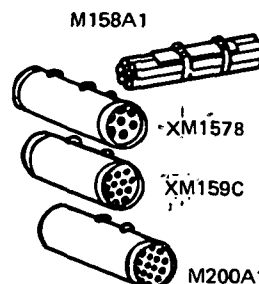


ITEM	WT	
MOTOR MK40 & MODS	11.22 LB	39.30 IN
WARHEAD M151	8.70 LB	10.40 IN
WARHEAD M229	16.10 LB	20.40 IN
FUZE M423	0.62 LB	3.11 IN
M429	0.90 LB	5.02 IN

I	2.75 IN FFAR WT=28.22 LB LG-64.72 IN CG-26.90 IN
II	2.75 IN FFAR WT-27.94 LB LG-62.81 IN CG-25.35 IN
III	2.75 IN FFAR WT-20.82 LB LG-54.72 IN CG-23.10 IN
IV	2.75 IN FFAR WT-20.54 LB LG-52.81 IN CG-21.60 IN

ARMY ROCKET LAUNCHERS

LAUNCHER	EMPTY				LOADED M229 WARHEAD				LOADED M151 WARHEAD			
	WT	LG	DIA	CG1	M429 FUZE		M423 FUZE		M429 FUZE		M423 FUZE	
	LBS	IN	IN		WT	CG	WT	CG	WT	CG	WT	CG
XM157B	67.0	59.9	9.8	31.0	264.5	23.2	262.6	23.5	212.7	28.1	210.8	28.4
M158A1	48.0	58.0	9.9	30.1	245.5	22.1	243.6	22.4	193.7	27.3	191.8	27.6
XM159C ²	130.0	59.9	15.5	31.0	468.6	23.4	465.3	23.7	526.6	27.8	520.3	28.1
XM159C ³	152.0	59.9	15.5	30.5	525.1	23.1	521.2	23.4	547.6	27.8	542.3	28.1
					490.6	23.8	487.3	24.0				
					547.1	23.5	543.2	23.7				
M200 ³ M200A1 ³	139.0	60.6	15.7	31.4	688.2	22.8	682.9	23.2	534.6	28.8	529.3	29.2
					476.6	23.5	473.3	23.8				
					533.1	23.2	529.2	23.5				
					674.2	23.8	668.9	24.1				



1. CG MEASUREMENTS ARE TAKEN FROM FORWARD END OF LAUNCHERS OR ROCKET
2. WHEN USING M229 WARHEADS THESE LAUNCHERS (SERIAL NOS 004040 AND BELOW) ARE LIMITED TO 14 ROCKETS ON INBOARD EXTERNAL STORES STATION LH AND RH DUE TO LAUNCHER LIMITATION, AND 12 ROCKETS ON OUTBOARD EXTERNAL STORES STATION LH AND RH DUE TO AIRCRAFT LIMITATION FOR AH-1G AND 14 ROCKETS ON XM156 MULTIARMAMENT MOUNT ON UH-1C DUE TO LAUNCHER SUPPORT STRUCTURE WEIGHT LIMITATION

3. WHEN USING M229 WARHEADS THESE LAUNCHERS ARE LIMITED TO 12 ROCKETS ON OUTBOARD EXTERNAL STORES STATIONS LH AND RH DUE TO AH-1G LIMITATION AND 14 ROCKETS ON XM156 MULTIARMAMENT MOUNT ON UH-1C DUE TO LAUNCHER SUPPORT STRUCTURE WEIGHT LIMITATION. LAUNCHERS (SERIAL NOS 004041 AND SUBSEQUENT FOR XM159C) AUTHORIZED FOR FULL LOAD OF ROCKETS WITH M229 WARHEADS. WEIGHTS AND CG MEASUREMENTS ARE SHOWN FOR 12, 14 AND 19 ROCKETS/M229 WARHEADS

AV 012029

Figure 2-29. 2.75 Inch rockets and rocket launchers

2-21. M158A1 2.75 Inch Rocket Launcher (7-Tube).

Rocket Launcher:	M158A1	
Aircraft Series:	UH1B/C/M	AH-1G
Average Procurement Price:	\$382.	
Type Classification:	STD A	
Nomenclature:	Launcher, Rocket Aircraft, 2.75 Inch – M158A1 (7-Tube).	
Description:	The M158A1 is a reparable 7-tube 2.75 inch rocket launcher used on the UH1B/C/M and AH1G Aircrafts. It is 58 inches long and weighs 48 lbs.	
Remarks:	TOE Authorization – not available this printing. Predicted year end assets: FY 1973 – 4,400	
Basis of Issue:	Approved BOI not available. For planning purposes: 2 each per UH-1B/C/M armed with M21 Subsystem. 1 each per AH-1G aircraft (all).	

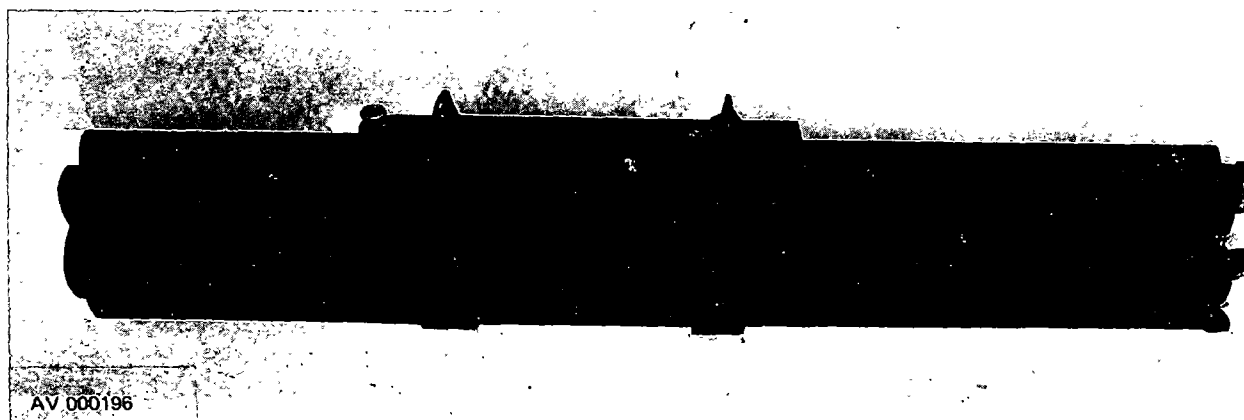
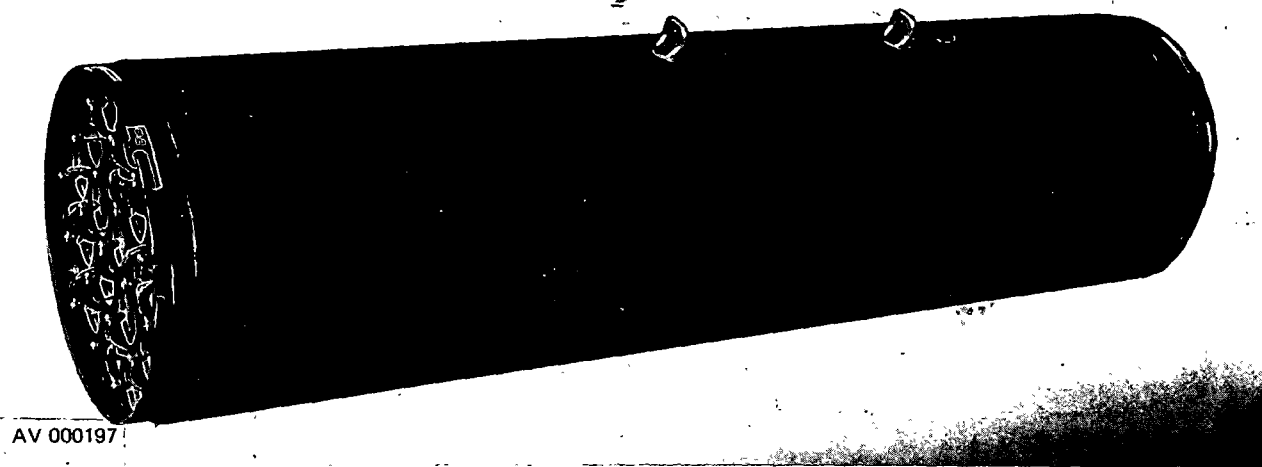


Figure 2-30. Launcher, rocket aircraft, 2.75 inch-M158A1 (7-tube)

2-22. M200A1 2.75" Rocket Launcher (19-Tube).

Rocket Launcher:	M200A1	
Aircraft Series:	UH1B/C/M	AH-1G
Average Procurement Price:	\$972	
Type Classification:	STD A	
Nomenclature:	Launcher, Rocket Aircraft, 2.75 inch M200A1.	
Description:	The M200A1 is a 19-tube reparable 2.75 inch rocket launcher, used on the UH1B/C/M and AH1G Aircrafts. It is 60.6 inches long and weighs 139 lbs.	
Remarks:	TOE Authorization -- not available this printing. Predicted year end assets: FY 1973 -- 4,400	
Basis of Issue:	Approved BOI not available. For Planning Purposes. 2 each per UH1B/C/M equipped with XM156 mount 3 each per AH-1G aircraft	



AV 000197

Figure 2-31. Launcher, rocket aircraft, 2.75 inch M200A-1 (19-tube)

2-23. M22 Armament Subsystem, Guided Missile Launcher.

ARMAMENT SUBSYSTEM: M22
 APPLICABLE AIRCRAFT – TYPE, MODEL, SERIES: UH-1B/C
 AVERAGE PROCUREMENT PRICE: \$34,000 (estimate)
 TYPE CLASSIFICATION: Standard A

NOMENCLATURE: Armament subsystem, helicopter, guided missile launcher.

DESCRIPTION: The M22 system includes a guidance control box, missile selector box, control stick, and six launchers. Items required to complete the airborne subsystem are an MK-8 pilots sight, a stabilized optical 6X sight for the gunner, two booms for mounting launchers (three per side), and jettisoning equipment. An adaption kit is required for attachment of system components to the helicopter. Operation of the subsystem requires close coordination between pilot and co-pilot/gunner.

CHARACTERISTICS:

EFFECTIVE RANGE:	3000 meters
ELEVATION:	Missile directed in flight by wire command link.
MISSILE VELOCITY:	180 meters/second cruise
RATE OF FIRE:	As selected by pilot/gunner.
TRAVERSE:	Missile directed in flight by wire command link.
EMPTY WT: 272 lbs	LOADED WT: 650 lbs
MISSILE CAPACITY:	6 missiles (3 each side)
AMMO TYPE:	AGM-22B Missile, 63 lbs each
SIGHTING:	Pilot MK8 lighted roof mounted. Co-pilot/gunner 6x42 power anti-collision binocular (M-55) or monocular (M-58.)
DATA:	Complete outboard stores are jettisonable, or each missile.

COST PER FLYING HOUR:

Maintenance:	Not available
Repair parts:	Not available

MAINTENANCE AND SUPPLY:

Maintenance instruction:	Organizational and direct support TM 9-1400-461-20 and -35
Repair parts:	TM 9-1400-461-12P and -35P
Special tools:	TM 9-1400-461-12P and -35P
Shop sets:	TM 9-1400-461-12P and -35P

MODIFICATION DATA REQUIRED FOR INSTALLATION, FUNDING, CONTROLS, AND OPERATING INSTRUCTIONS:

Operational Instructions contained in TM 55-1520-219-10 and TM 55-1520-220-10 manuals.

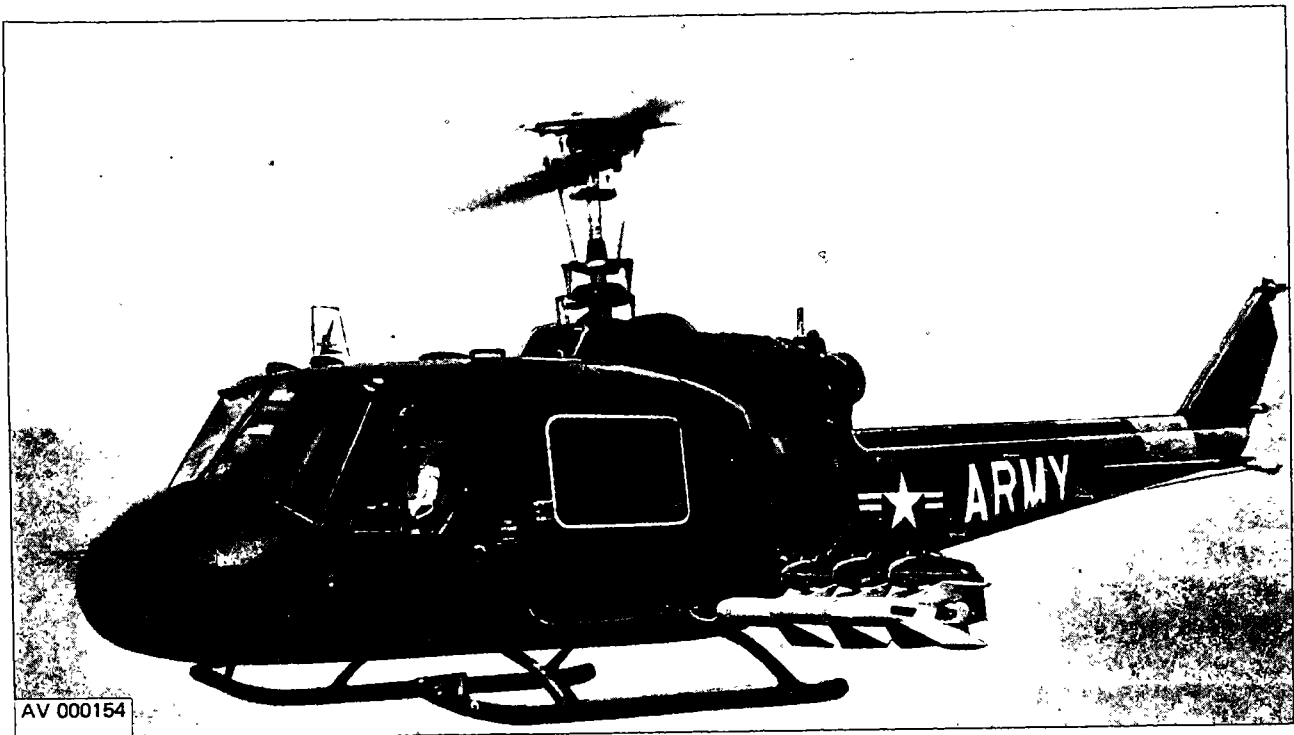


Figure 2-32. M22 Armament system installed on UH-1B/C (Iroquois) helicopter

2-24. XM26 Armament Subsystem, Guided Missile Launcher.

ARMAMENT SUBSYSTEM: XM26

APPLICABLE AIRCRAFT – TYPE, MODEL, SERIES: UH-1B/C

AVERAGE PROCUREMENT PRICE: \$225,000 (estimate)

TYPE CLASSIFICATION: Standard A

NOMENCLATURE: Armament subsystem, guided missile launcher.

DESCRIPTION: The XM26 (TOW) helicopter armament subsystem is to provide the Army with a highly mobile, airborne, heavy point fire weapon system. This systems uses the TOW (Tube Launcher, Optically Tracked, Wire Command Link) guided missile. The XM26 is designed to replace the M22 subsystem. Two launchers (one mounted to hard points on either side of the helicopter by a special pylon) are provided with three missiles each. Stabilized sight sensors are utilized in the guidance technique with command signals being fed to the missile through thin wires.

CHARACTERISTICS:

EFFECTIVE RANGE:	Classified
ELEVATION:	Missile directed in flight by wire command link.
MISSILE VELOCITY:	250 Ft/Second at launch, 1090 Ft/Sec at burnout
RATE OF FIRE:	As selected by pilot/gunner.
TRAVERSE:	
EMPTY WT: (CLASSIFIED)	LOADED WT: (CLASSIFIED)
AMMUNITION:	
CAPACITY:	6 missiles (three each side)
TYPE:	
SIGHTING:	Stabilized cockpit line of view.

COST PER FLYING HOUR:

Maintenance:	Not available
Repair parts:	Not available

MAINTENANCE AND SUPPLY:

Maintenance Instructions:	Organizational and Direct Support
Repair parts:	Not available
Special tools:	Not available
Shop sets:	Not available

MODIFICATION DATA REQUIRED FOR INSTALLATION, FUNDING, CONTROLS, AND OPERATING INSTRUCTIONS:

REMARKS: This program was terminated upon completion of the engineering development phase.



Figure 2-33. XM26 Armament subsystem

2-25. XM19 Dispensing Subsystem.

Dispenser:	XM19
Aircraft:	UH-1/B/C/D/H
Application:	One in troop cargo compartment
Flares per dispenser:	24 Flares, MK45 w/adapter
Weight:	150 lbs empty 822 lbs with flares
Overall Length:	118 inches w/snout extended 81.0 inches w/snout collapsed
Width:	16.0 inches
Height:	46.0 inches
Rate of Ejection:	Manually controlled
Elevation:	Attitude of aircraft
Transverse:	Attitude of aircraft
Sighting:	Visual assessment
Status:	LP
DODIC:	L106

DESCRIPTION: MK45 Flares are loaded into the dispenser with pull cable assembly disk inserted in the overhead track. Immediately prior to launch, the flare safety pin is pulled. The flare to be launched is positioned so that its base is stopped by the foot on the base tray. The operator then pushes the upper portion of the flare outward. The base of the flare then swings outward, providing sufficient force on the pull cable assembly to shear a pin, permitting the flare to fall free. A pull pin is provided for manual jettisoning of the load and flare rack.

MK45 Flare, Aircraft, Parachute.

Illumination:	2,000,000 candlepower
Burntime:	210 seconds
Weight:	28 lbs
Overall Length:	36 inches
Diameter:	4.87 inches
Adjustable Time:	Mechanical/pyrotechnic fuze
Status:	Std B
DODIC:	1370-L424

DESCRIPTION: Prior to launch, the fuze is set for the desired drop delay (in feet below the aircraft), and the safety pin removed. When launched, the weight of the falling flare against the pull cable exerts sufficient force to break a shear pin to initiate the delay and subsequently ignite the fuze. At the desired time, the parachute/candle assembly is ejected from the outer container, and activated. Near the end of burning, the parachute is collapsed and the spent flare falls rapidly to the ground.



Figure 2-34. XM19 Dispenser

2-26. XM127 Dispensing Subsystem, XM170 Flare.

Dispenser: XM127
Aircraft: UH-1D/H

Application one on each side of aircraft

Flares per dispenser: 19

Weight: 105 lbs Empty

Rate of Ejection: Manually controlled

Elevation: Attitude of aircraft

Transverse: Attitude of aircraft

Sighting: Visual assessment

Data: Each dispenser has 19/2.75 inch diameter tubes

Status: Dispenser to enter ED and replace XM18 dispenser

Flare: XM170

Illumination: 1,500,000 candlepower

Burntime: 135 seconds

Weight: 12.5 pounds

Overall Length: 35.0 inches

Diameter: 2.75 inches

Mechanical Time

Fuze: 4 to 60 seconds

Status: ED

TC/A FY75

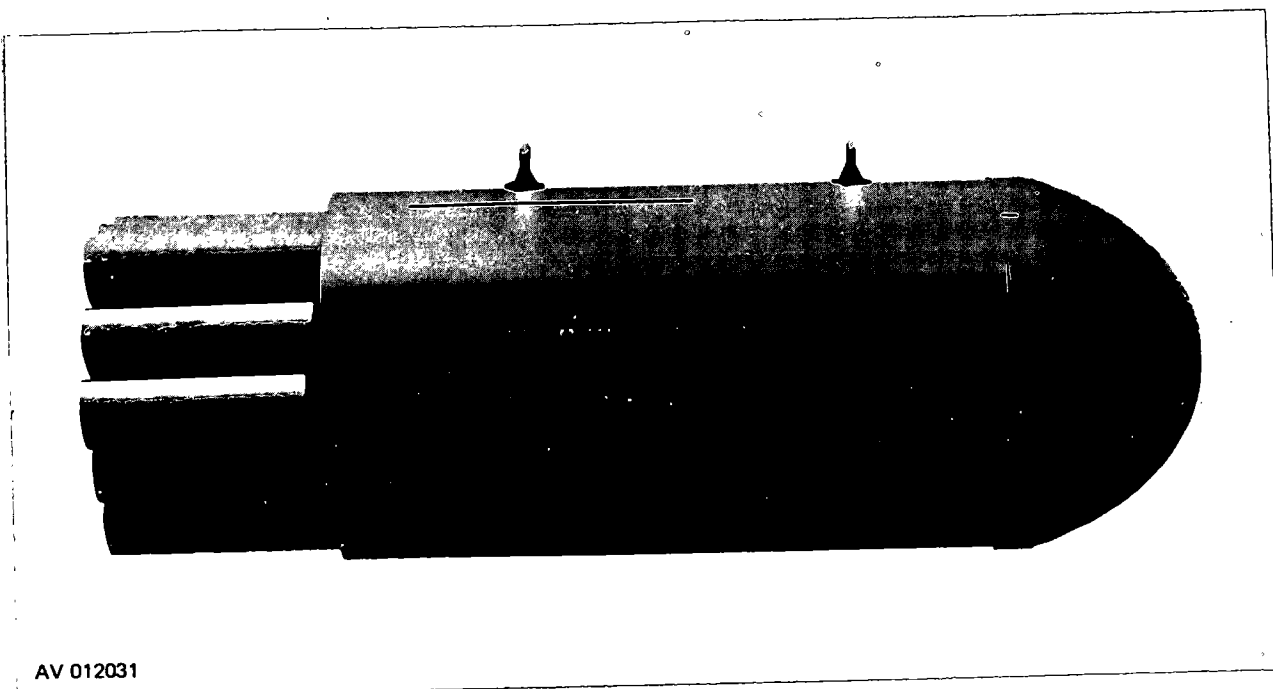


Figure 2-35. XM127 Dispenser

2-27. XM132 Safety and Arming Device Subsystem, Helicopter, 2.75 inch Rocket Launcher.

ARMAMENT SUBSYSTEM: XM132

AIRCRAFT - AH-1G

AVERAGE PROCUREMENT PRICE: \$8,000

TYPE CLASSIFICATION: Standard A, 1st Qtr FY 1974

NOMENCLATURE: Safety and Arming Device XM132 for use with Resistor Capacitor (RC) Electronic Fuzes.

DESCRIPTION: The XM132 consists of five major components as follows:

1 ea fuze set panel, part no. 9257371

1 ea setter, part no. 9260177

2 ea junction box, part no. 9257548 and 1 ea power transfer relay

The XM132 subsystem used in conjunction with modified M200A1 19 tube launchers permits the pilot to select, prior to firing, the desired functioning mode or functioning distance for the XM433E1 and XM439 RC fuzes, respectively, for optimum mission results. The system is designed to interface with the current intervalometers used in Huey Cobra aircraft. When RC fuzes are not used, the XM132 Safety and Arming Subsystem can be completely bypassed.

CHARACTERISTICS:

EFFECTIVE RANGE:	3500 meters (10 lb warhd)
	3000 meters (17 lb warhd)
RATE OF FIRE:	16 per second

COST PER FLYING HOUR:

Maintenance:	Not available
Repair parts:	Not available

MAINTENANCE AND SUPPLY:

Organizational maintenance limited to portable test set and modular replacement of fuze set panel, setter, and junction boxes. Unserviceable modules will be shipped to the depot for component repair and calibration of the setter.

MODIFICATION DATA REQUIRED FOR INSTALLATION, FUNDING, CONTROLS AND OPERATING INSTRUCTIONS: Not available

REMARKS: TM's will be available prior to 1st quarter FY 1974.

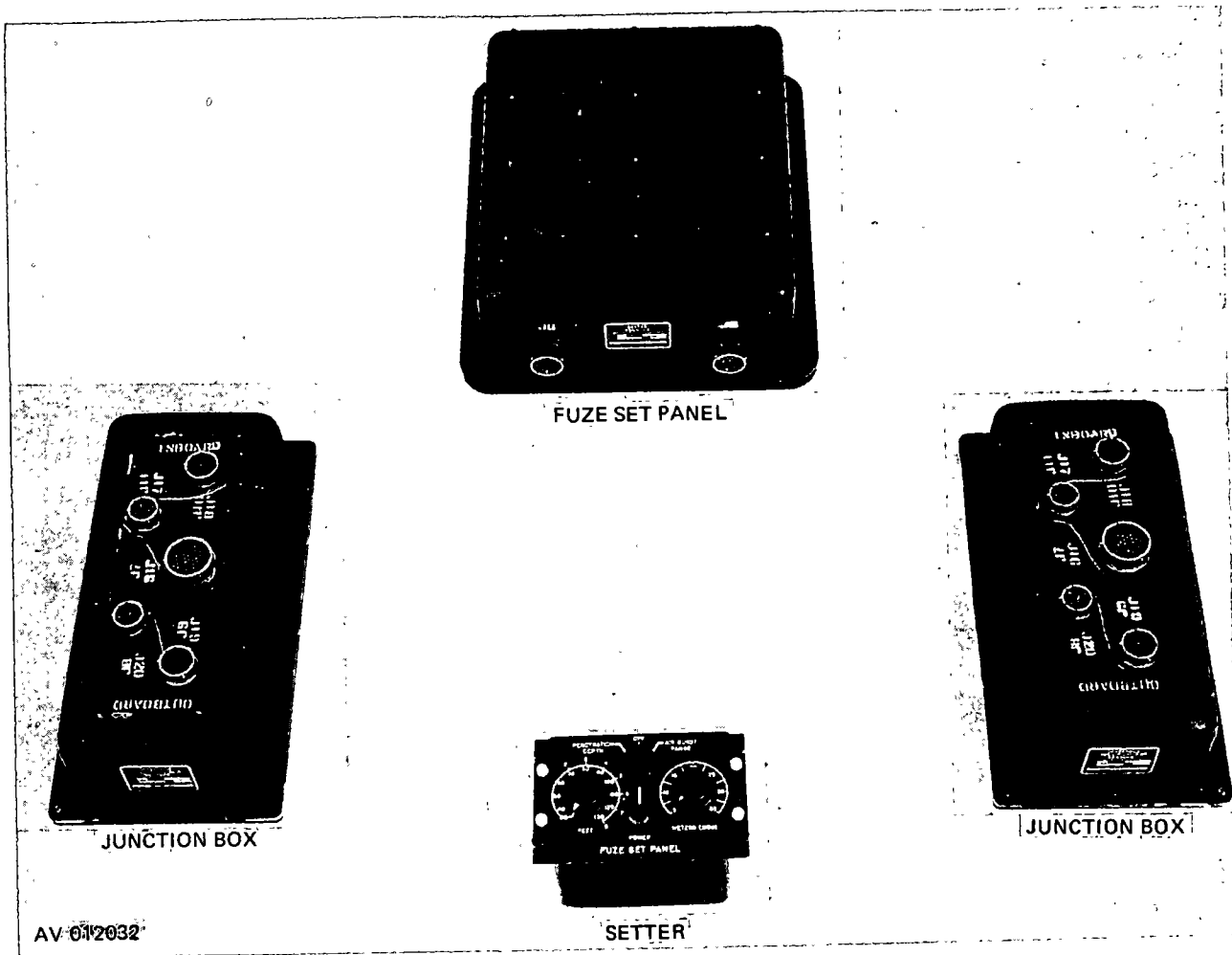


Figure 2-36. XM132 Safety and arming device components

2-28. Aircraft Armament Subsystems Ammunition.

7.62mm Cartridges*

MODEL DESIGNATION & TYPE	STD STATUS	PURPOSE	PACKAGING				DOT CLASSIFICATION	DODIC	REMARKS
			ROUNDS/ BOX	TYPE BOX	CU FT	WEIGHT POUNDS			
7.62mm Ball Linked 4/1 w/Tracer	STD A	Anti- Personnel & Training	200	Metal M19A1	0.45	19	Small Arms Ammo C1 C QD 1	1305-A131	For M60 Series Guns
7.62mm Ball Linked 4/1 w/Tracer	STD A	Anti- Personnel & Training	1500	Metal M548	1.30	120	Small Arms Ammo C1 C QD 1	1305-A165	Mini-Gun

- NOTE:
1. Although other linked 7.62mm ammunition may be used with the above weapons, a basis of issue has not been established for other 7.62mm types or packs for Army aircraft application.
 2. Only the primary DODIC is shown.
 3. Although the two types of ammunition are interchangeable, the Mini-Gun type is preferred for its ease in loading and its quality features (polished brass, position of links, etc.).

* Reference TM 9-1305-200

Source: MUCOM (AMSMU-MS-IM)

2-28. Aircraft Armament Subsystems Ammunition (CONT).

50 Caliber Cartridges*

MODEL DESIGNATION & TYPE	STD STATUS	PURPOSE	PACKAGING				DOT CLASSIFICATION	DODIC	REMARKS
			ROUNDS/ BOX	TYPE BOX	CU FT	WEIGHT POUNDS			
.50 Caliber, 4 API Linked w/APIIT	STD A	Anti- Personnel & Anti- Material	100	Metal M2A1	.45	37.5	Small Arms Ammo C1 C QD 1	1305-A577	
.50 Caliber, 4 Ball Linked w/Tracer	STD A	Anti- Personnel & Training	100	Metal M2A1	.45	37.5	Small Arms Ammo C1 C QD 1	1305-A577	

NOTE: API/APIIT may also be linked 3 to 1 ratio and may also be issued for training.
Only primary DODIC is shown.

* Reference TM 9-1305-200

2-28. Aircraft Armament Subsystems Ammunition (CONT).

20mm Cartridges*

MODEL DESIGNATION & TYPE	STD STATUS	PURPOSE	PACKAGING				DOT CLASSIFICATION	DODIC	REMARKS
			ROUNDS/ BOX	TYPE BOX	CU FT	WEIGHT POUNDS			
M56A3 HEI Linked 4/1 with M220 TPT	STD A	Anti- Personnel Light Anti- Materiel, Capable of Initiating Oil Fires	100	Metal M548	1.3	93	Ammo F/Cannon W/Expl. Proj. C1 A QD C1 7	1305-A653	For Gun M195 Range to 3000 meters
M55A2 TP Linked	STD A	Target Practice	100	Metal M548	1.30	93	Small Arms Ammo C1 C QD 1	1305-A926	For Gun M195 Range to 3000 meters
M55A2 Linked 4/1 with M220 TPT	STD A	Target Practice w/Tracer	100	Metal M548	1.30	93	Small Arms Ammo C1 C QD 1	1305-A896	For Gun M195 Range to 3000 meters

*Reference TM 19-1901-1 and TM 9-1900-1

2-28. Aircraft Armament Subsystems Ammunition (CONT).

30mm Cartridges*

MODEL DESIGNATION & TYPE	STD STATUS	PURPOSE	PACKAGING				DOT CLASSIFICATION	DODIC	REMARKS
			ROUNDS/ BOX	TYPE BOX	CU FT	WEIGHT POUNDS			
XM639E1 Practice	ET Complete	Training Practice Weapons Acceptance Test	80	Metal XM592	1.5	120	Small Arms Ammo	FSN 1305- 809-2701	Range 3000 meters Muzzle Velocity 2200 fps used on XM140 cannon.
XM552 HE DP	ET Complete	Anti- Personnel Anti- Light Armor	80	Metal XM592	1.5	120	Ammo for Cannon with Explosive Projectile	FSN 1305- 809-2690	Range 3000 meters Muzzle Velocity 2200 fps used on XM140 cannon.
Solid Aluminum Dummy	N/A	For cycling Feed System	80	N/A	N/A	N/A	N/A	N/A	Used on XM52 weapon subsystem.

*Reference: POMM 1305-201-12 (PADB7)

2-28. Aircraft Armament Subsystems Ammunition (CONT).

40mm Cartridges*

MODEL DESIGNATION & TYPE	STD STATUS	PURPOSE	PACKAGING				DOT CLASSIFICATION	DODIC	REMARKS
			ROUNDS/ BOX	TYPE BOX	CU FT	WEIGHT POUNDS			
M383 HE	STD B	Anti- Personnel	50 (all linked)	Wood	1.2	53	Ammo F/Cannon W/Expl. Proj. Dot Shipp. C1 A QD C1 7	1310 B571	W/M16A2 link Ref. DTM 1310-221-12 (PA-AD-MB)
M384 HE	STD B	Anti- Personnel	50 (all linked)	Wood	1.2	53	Ammo F/Cannon W/Expl. Proj. Dot Shipp. C1 A QD C1 7	1310 B572	W/M16 link
								1310 B470	W/M16A1 link Ref. POMM 1310-204-12 (PA-DB7)
M385 Practice	STD A	Practice (Solid Aluminum or Plastic Proj)	50 (all linked)	Wood	1.2	53	Ammo F/Cannon W/Inert Proj. Dot Shipp. C1 C QD C1 1	1310 B576	W/M16 link
								1310 B480	W/M16A1 link
M430 HE DP	STD A	Anti- Personnel Anti- Materiel (Shaped Chg)	50 (all linked)	Wood	1.2	53	Ammo F/Cannon W/Expl. Proj. Dot Shipp. C1 A QD C1 7	1310 B542	W/M16A2 link Ref. DTM 1310-223-12 (PA-AD-MB)
XM677 HE T	Linked 1/3 M383 Development	Anti- Personnel W/Traccr	50 (linked 1 rd to every 3 M383/M384)	Wood	1.2	53	Ammo F/Cannon W/Expl. Proj. Dot Shipp. C1 A QD C1 7	1310 B529	Ref. DTM 1310-217-12 (PA-DB7)
XM677 HE T								1310 B527	
XM683 HE	Develop- ment	Anti- Personnel (extended ranged RAP)	50 (all linked)	Wood	1.2	53	Ammo F/Cannon W/Expl. Proj. Dot Shipp. C1 A QD C1 7	1310 B471	Rocket Assisted Projectile Extended Range 3000 meters max. Ref. DTM 1310-220-12 (PA-DB7)
XM684 HE	LPT	Anti- Personnel	50 (all linked)	Wood	1.2	53	Ammo F/Cannon W/Expl. Proj. Dot Shipp. C1 A QD C1 7	1310 B573	VT Fuze W/M383 Proj. Body W/M16A2 link Ref. DTM 1310-218-12 (PA-DB7)

2-28. Aircraft Armament Subsystems Ammunition (CONT).

40mm Cartridges* (CONT).

NOTES: 1. All rds linked with M16A1 link unless otherwise specified.

2. Those rds linked with M16 link are for use Armament Subsystem using M75 Automatic Grenade Launcher. Those rds linked w/M16A1 or M16A2 links are suitable for use in Armament Subsystem using the M75 or M129 Automatic Grenade Launcher.

2-29. Aircraft Armament Subsystems Rockets.

2.75 inch Rockets*

TYPE	STDZN	PURPOSE	PACKAGING				DOT CLASS	FSC & DODIC	REMARKS Wpn Lchr M158A1 M200A1
			RDS/Per Box	Type	Cu Ft	Wt Lbs			
Rkt 2.75" Flech w/whd WDU-4A/A w/base fuze w/Mtr MK40	A	Anti- Personnel	4 and 25	Wood	3.0 17.9	127 776	A	1340-H459	Same
Rkt 2.75" HEAT w/whd MK5 w/Fuze MK181 w/ Mtr MK40	A	Armor Piercing Anti- Personnel	3 4	Wood Wood	2.8 3.2	102 125	A	1340-H487	Same
Rkt 2.75" HE w/whd M229 w/Fuze M429 w/Mtr MK40	A	Anti- Personnel	4 and 25	Wood Wood	3.47 20.8	162 996	A	1340-H488	Same
Rkt 2.75" HE w/whd M151 w/Fuze M429 w/ Mtr MK40	A	Anti- Personnel	4 and 25	Wood Wood	3.0 17.9	127 776	A	1340-H489	Same
Rkt 2.75" HE w/whd M151 w/Fuze M423 w/Mtr MK40	A	Anti- Personnel Anti- Materiel	4 and 25	Wood Wood	3.0 17.9	127 776	A	1340-H490	Same
Rkt CML Agt 2.75" SMK WP M156 w/Fuze M423 w/ Mtr MK40	A	Target Marking & Incendiary	4 and 25	Wood Wood	3.0 17.9	127 776	A	1340-H519	Same
Rkt 2.75" HE w/whd M229 w/Fuze M423 w/Mtr MK40	A	Anti- Personnel Anti- Materiel	4 and 25	Wood Wood	3.47 20.8	162 996	A	1340-H543	Same
Rkt 2.75" Practice WTU-1/B whd/slug w/ Mtr MK40	A	Practice & Training	4 and 25	Wood Wood	3.0 17.9	127 776	B	1340-H828	Same

2-29. Aircraft Armament Subsystems Rockets (CONT).

2.75 inch Rockets*									
TYPE	STDZN	PURPOSE	PACKAGING				DOT CLASS	FSC & DODIC	REMARKS Wpn Lchr M158A1 M200A1
			RDS/Per Box	Type	Cu Ft	Wt Lbs			
Rkt 2.75" Practice XM253 whd/slug w/Mtr MK40		Training & Testing	4 and 25	Wood Wood	3.47 20.8	162 996	B	1340-H468	Same
Rkt 2.75" HEAT Whd XM247 w/Fuze PIBD XM438 w/Mtr MK40		Armor Piercing Anti- Personnel	4 and 25	Wood Wood	3.47 20.8	147 886	A	1340-H826 (will replace 1340-H487)	Same
Rkt 2.75" HE w/ Whd M229 w/Fuze XM433 w/Mtr MK40		Selectable Functioning f/Bunker Penetration & Anti- Personnel	4 and 25	Wood Wood	3.47 20.8	162 996	A	1340-H469	M200A1 Mod
Rkt 2.75" HE w/ Whd M151 w/Fuze XM433 w/Mtr MK40*		Selectable Functioning f/Bunker Penetration & Anti- Personnel	4 and 25	Wood Wood	3.0 17.9	127 776	A	1340-H471	M200A1 Mod
Rkt 2.75" Flech w/ Whd XM255 w/Fuze RC XM439		Selectable Functioning Anti- Personnel Anti- Materiel	4 and 25	Wood Wood	3.0 17.9	127 776	A	1340- (will replace 1340-H459)	M200A1 Mod

*Reference: Project Managers Office, 2.75 Inch Rocket System Manual - TM 9-1340

Source: MUCOM (AMSMU-MS-IM)

2-30. Aircraft Armor Systems.

Armor protection against enemy small arms fire is provided for Army aircraft crew and critical components. Types of crew protection include armored seat

bottoms, side panels, and floor plates. Protection of critical components is provided by means of armor for engine, fuel and oil accessories, and flight control items. The amount and placement of protective armor varies among different types of aircraft systems.

2-30. Aircraft Armor Systems (CONT).

AIRCRAFT	SYSTEM	ARMOR WEIGHT	MATERIAL	PART NO.	FSN
AH-1G	Crew and component protection	243 lb/acft	B ₄ C with Fiberglass Backing	N/A - Furnished with aircraft and not available in kit form.	
CH-47A	Crew protection (Aerosmith seat)	234 lb/acft	Al ₂ O ₃ with Fiberglass Backing	1560-CH47-225	1680-912-3944
CH-47A/B/C	Crew protection (Alsco seat)	139 lb/acft	Al ₂ O ₃ with Fiberglass Backing	1560-CH47-300	1680-947-9829
CH-47A/B	Component protection	491 lb/acft	DPS and Fire Suppression Foam	113550-3	1560-945-4828
CH-47C	Component protection	510 lb/acft	DPS and Fire Suppression Foam	113759-2	1560-725-6073
CH-54A	Crew and component protection	1164 lb/acft	B ₄ C with Fiberglass and DPS	6407-75100-013	1680-073-8396
CH-54B	Crew and component protection	1233 lb/acft	B ₄ C with Fiberglass and DPSA	N/A - Furnished with aircraft and not available in kit form.	
OH-6A	Crew and component protection	119 lb/acft	B ₄ C with Fiberglass Backing and DPS	1560-OH6-000-3	1560-133-8381
OH-13	Crew protection	45 lb/acft	B ₄ C with Fiberglass Backing	1680-OH13-013-1	1680-939-7796
OH-58A	Crew and component protection	112 lb/acft	B ₄ C with Fiberglass Backing	N/A - Furnished with acft and not available in kit form.	
UH-1B/C/D/H/M	Crew protection	210 lb/acft	Al ₂ O ₃ with Aluminum Backing	178061-3 and 178062-3	1680-933-9384 and 1680-933-9385
UH-1B/C/D/H/M	Gunner protection	46 lb/acft	Al ₂ O ₃ with Aluminum Backing	1560-UH1-350-1	1680-067-8208

2-30. Aircraft Armor Systems (CONT).

AIRCRAFT	SYSTEM	ARMOR WEIGHT	MATERIAL	PART NO.	FSN
O-1	Crew protection	55 lb/acft	B ₄ C with Fiberglass Backing	1560-01-198-1	1680-943-0746
OV-1A/B/C	Crew protection consisting of combinations of: (1) Nose armor, KA-60 camera provisions 63 lb/acft (2) Nose armor, SLAR provisions 53 lb/acft (3) Nose armor, without KA-60 and SLAR provisions 65 lb/acft (4) Side armor, homing antenna provisions 21 lb/acft (5) Side armor, without homing antenna provisions 19 lb/acft (6) Side armor, side panel with circuit breaker panel aft center right panel 24 lb/acft (7) Side armor, side panel without circuit breaker panel 25 lb/acft (8) Side armor, side panel common to all aircraft 68 lb/acft (9) Extended side armor and floor armor on OV-1A and OV-1C, 181 lb/acft		Al ₂ O ₃ with Fiberglass Backing	1560-OV1-120-1 1560-OV1-121-1 1560-OV1-122-1 1560-OV1-123-1 1560-OV1-124-1 1560-OV1-125-1 1560-OV1-126-1 1560-OV1-127-1 1560-OV1-006-1	1560-947-3446 1560-947-3447 1560-947-3448 1560-947-3451 1560-947-3452 1560-947-3453 1560-947-3449 1560-947-3450 1560-943-0754

Al₂O₃ - Aluminum oxide composite armorB₄C - Boron carbide composite armor

SiC - Silicon carbide

DPS - Dual property steel armor

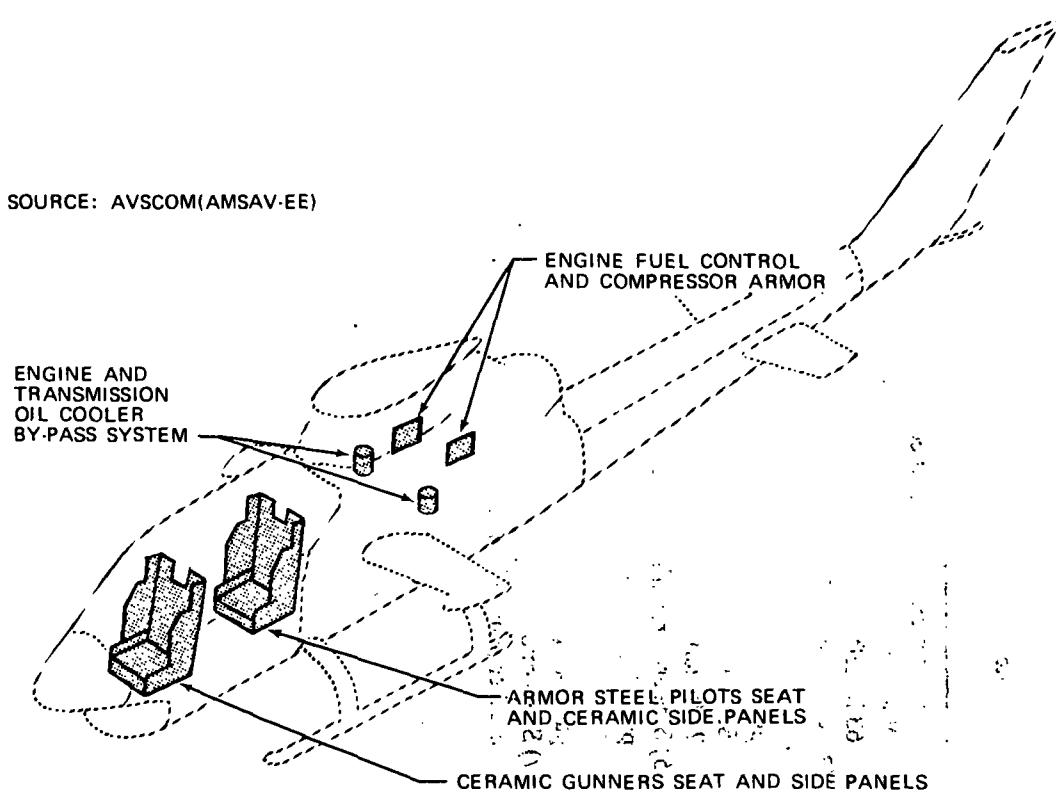
Source: AVSCOM (AMSAV-EE)

2-31. AH-1G Armor.

a. The AH-1G aircraft are provided with aircrew and critical component armor. The pilot's seat is made of dual hardness steel armor. The fixed side panels are made of a hard faced composite material. The entire passive defense system for the gunner is made of a hard faced composite material.

b. Critical component armor is located on each side of the engine to protect the engine compressor section and the fuel control unit. The standard fuel cells are self-sealing as follows: bottom 33% capacity against .50 caliber, center 33% capacity 30 caliber, and the top 34% is not self-sealing. The fuel crossover line is also self-sealing. The new crashworthy fuel cells are self-sealing against 20mm over their entire capacity. The fuel crossover line is self-sealing.

SOURCE: AVSCOM(AMSAV-EE)



AV 000216

Figure 2-37. AH-1G Armor

2-32. CH-47 Armor.

a. The CH-47 aircraft are provided with aircrew and critical component armor.

b. The aircrew armor material is aluminum oxide hard faced composite capable of defeating 30 caliber projectiles.

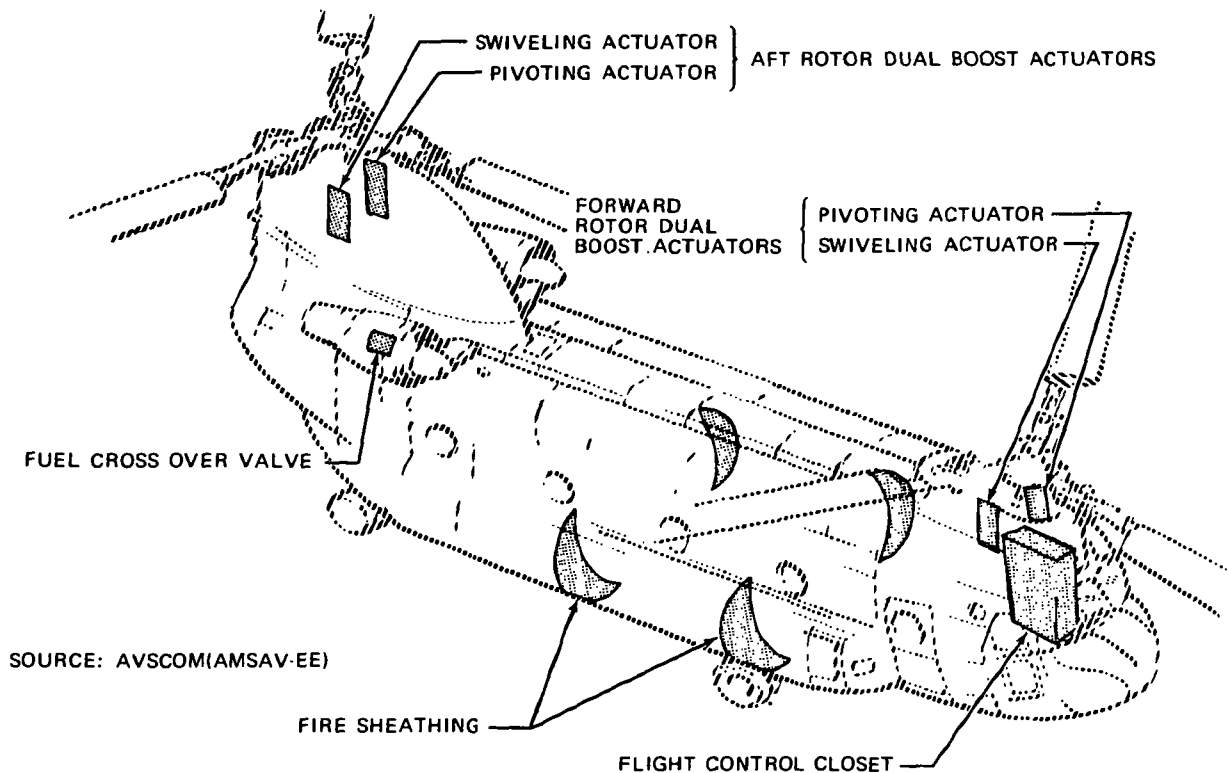
c. DPS armor has been provided for the following critical components:

(1) Armor for the fore and aft flight control actuators in four locations.

(2) Armor for the flight control closet.

(3) Armor for the fuel crossover valve.

(4) Fire suppression foam on fore and aft faces of both fuel tanks.



AV 000217

Figure 2-38. CH-47 Armor

2-33. Armor for the Armed and Armored Chinook.

a. Armor for the armed and armored Chinook consists of aircrew and component armor. The pilot and copilot have been provided with a crash attenuating integral 30 caliber armor seat.

b. The total installed weight of the armor system is 2700 pounds. Armor is provided for the following critical components:

(1) Controls closet area of flight controls system.

(2) Swiveling and pivoting dual actuators in forward and aft pylons.

(3) Copilot's control box.

(4) Linkage from copilot's controls to closet.

(5) Flight controls mix complex.

(6) Walking beam rod ends and bellcrank.

(7) Aft fuselage controls, rods, and bellcrank.

(8) Aft pylon controls, rods, and bellcrank.

(9) Accessory gear box, quill shaft.

c. The armor material is dual property steel capable of defeating 50 caliber API projectiles.

Source: AVSCOM (AMSAV-EE)

2-34. CH-54A Armor.

a. The CH-54A aircraft are equipped with aircrew and critical component armor. The pilot, copilot, and aft facing pilot are provided with armor placed on and around the existing seats. Protection is provided for the back, bottom, and sides. Frontal protection is via chest protector.

b. The 30 caliber armor material is primarily a boron carbide hard faced composite with dual hardness steel protecting the rod ends and bellcranks on the transmission deck. The weight of the armor for the pilot's seat is 120 pounds, for the copilot's seat is 111 pounds, and for the aft facing pilot's seat is 86 pounds. Armor is provided for the following critical components:

(1) Servos, rod ends, and bellcranks under the pilot's floor.

(2) Controls closet.

(3) External rod ends and bellcranks.

(4) Armored panel between the engine for separation purposes.

(5) Main servos.

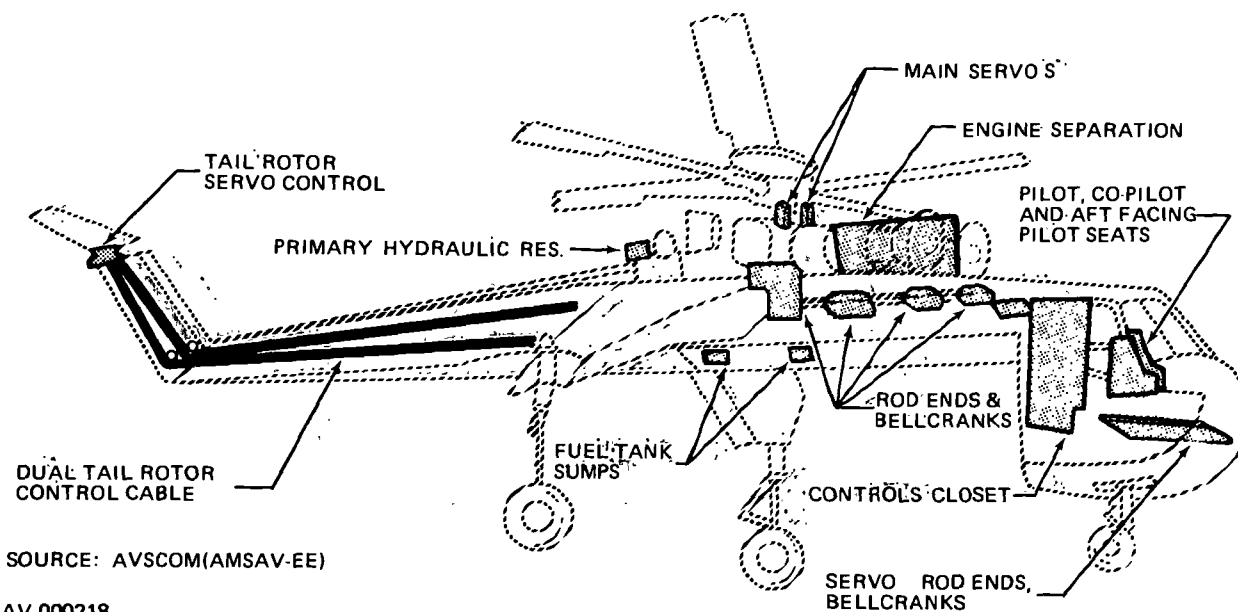
(6) Primary hydraulic reservoir.

(7) Fuel tank sumps.

(8) Tail rotor servo control.

(9) Incorporation of a dual tail rotor control cable.

c. Total increase in aircraft weight is 1167 pounds.



SOURCE: AVSCOM(AMSAV-EE)

AV 000218

Figure 2-39. CH-54A Armor

2-35. OH-6A Armor.

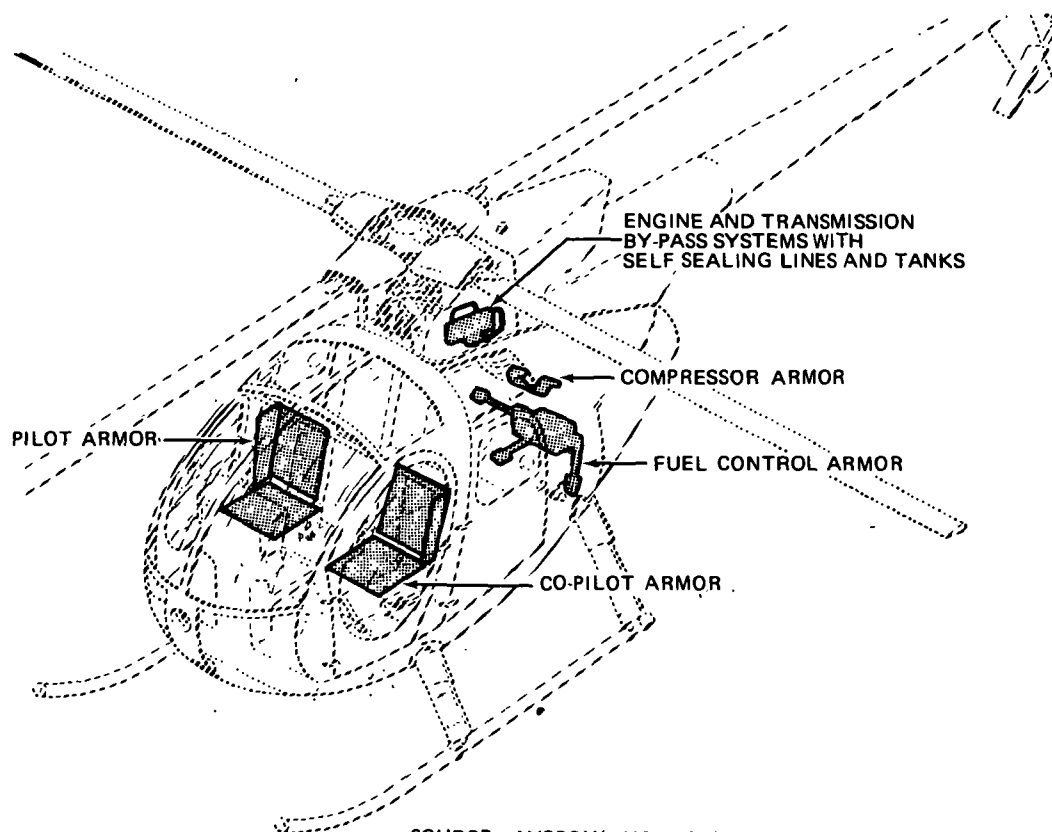
a. The passive protection system for the OH-6A aircraft consists of aircrew and critical component armor. The pilot and copilot is provided with armor placed on the existing seats. Protection is provided for the back, bottom, and sides. Frontal protection is via chest protector.

b. The armor material is a 30 caliber boron carbide hard faced composite except for the panel under the seat and the engine compressor panel which are of dual property steel.

c. The weight of the complete installed system is 130 pounds.

d. Armor is provided for the following critical components:

- (1) Engine compressor.
- (2) Self-sealing oil lines.
- (3) Self-sealing fuel lines.
- (4) Engine and transmission oil cooler bypass valves.
- (5) Fuel control valve.



AV 000219

SOURCE: AVSCOM(AMSAV-EE)

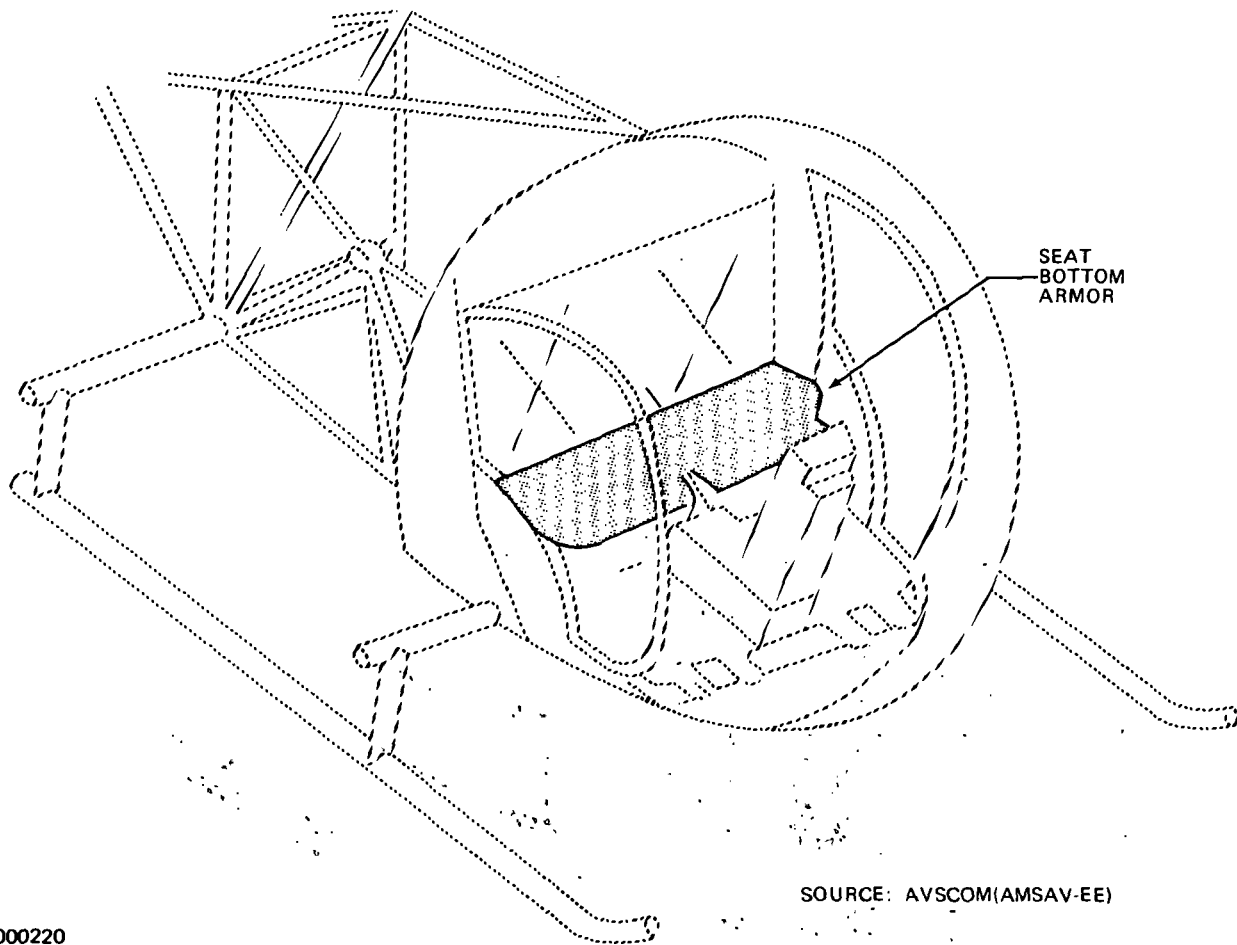
Figure 2-40. OH-6A Armor

2-36. OH-13 Armor.

a. The OH-13 aircraft are equipped with aircrew armor for the pilot, copilot, and observer. The armor protection consists of two flat plates which are installed under the aircraft seat cushions. The system

was designed to protect the crew members wearing the Natick developed front and back protector.

b. The material used for the aircrew armor is a 30 caliber, hard faced composite (HFC). The weight of the armor system is 45 pounds.



AV 000220

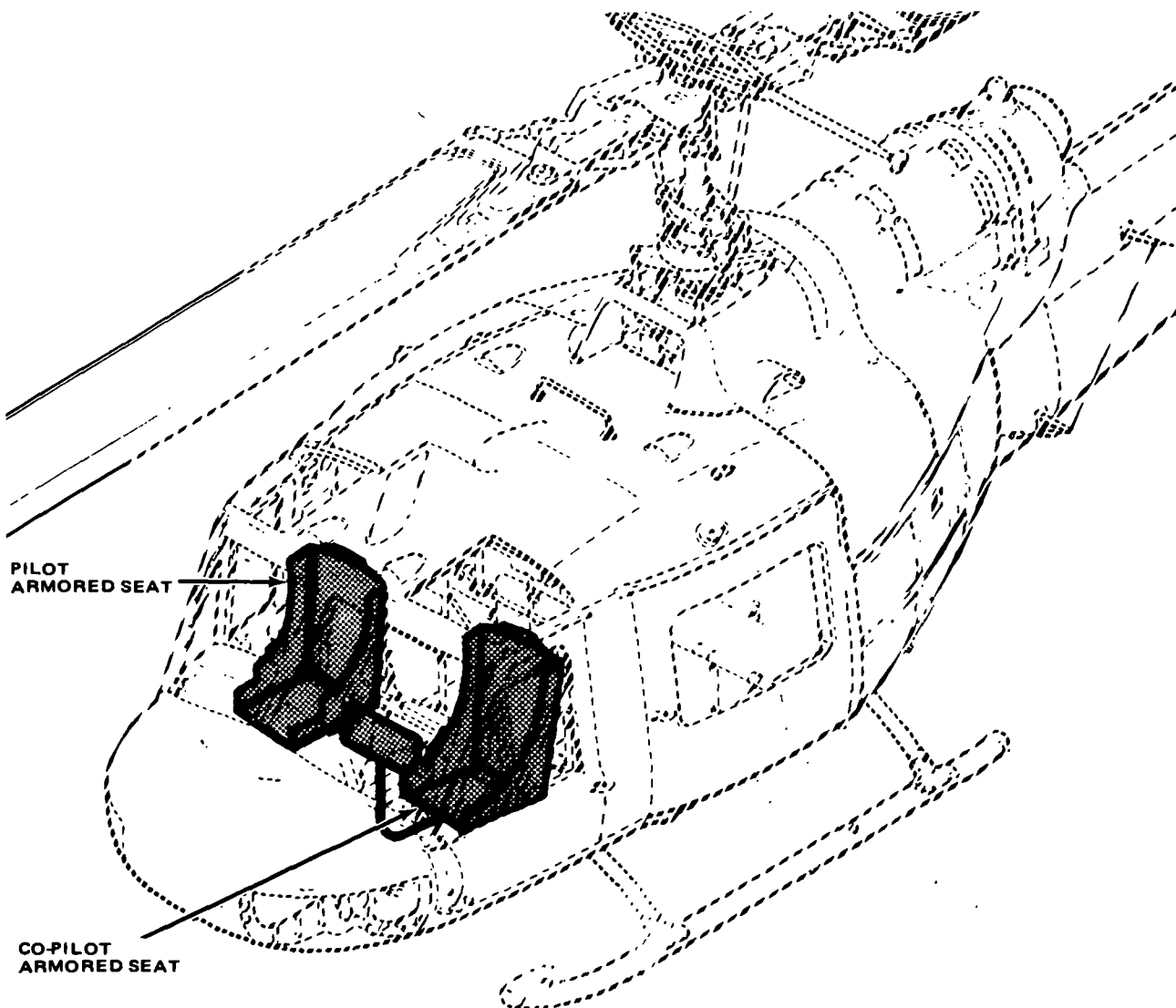
Figure 2-41. OH-13 Armor

2-37. UH-1B, C, D, Armor.

a. The UH-1 series aircraft are equipped with aircrew armor for the pilot and copilot. The armor consists of an integrated armored seat. Protection is provided from the bottom, rear, and sides. Frontal protection is via chest protector.

b. The armor material is aluminum oxide hard faced composite capable of defeating 30 caliber projectiles.

c. The headguard is an armor panel which attaches to the back of the seats. The gunner's seat armor unit is a plate of armor material securely fastened to the crew seats in the UH-1. It is provided with a cushion for the crewman to sit on.



SOURCE: AVSCOM(AMSAV-EE)

AV 000222

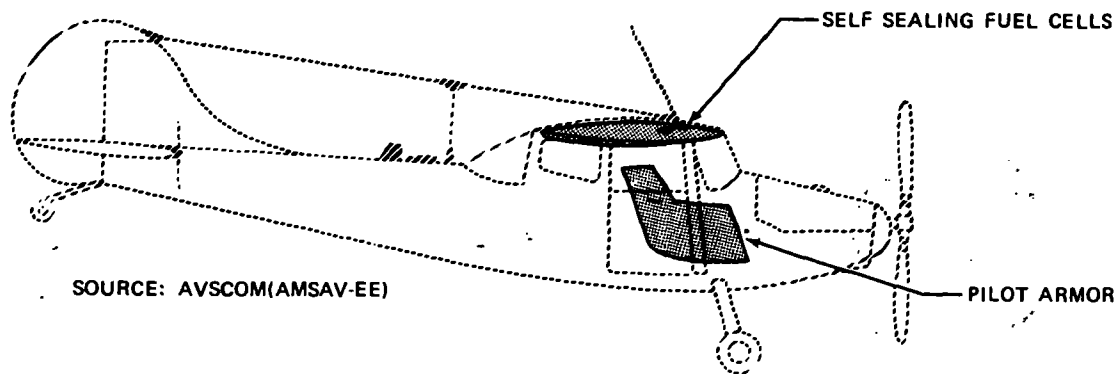
Figure 2-42. UH-1 Armor

2-38. O-1 Armor.

a. The O-1 aircraft are provided with pilot seat armor. The armor panels attach to the aircraft seat on both sides and on the seat back. The curved seat pan is

removed and a dropped pan with armor provides protection from underneath the seat.

b. The material used for the pilot's seat armor is 30 caliber hard faced composite (HFC). The weight of the armor is 54 pounds.



AV 000223

Figure 2-43. O-1 Armor

2-39. OV-1 Armor.

a. The OV-1 aircraft are provided with aircrew and critical component armor. The aircrew armor is located on the nose bulkhead cockpit sides, floor, hatch, and forward windows. This armor had to be mounted on the airframe since the ejection seat would not tolerate the weight.

b. The material used for aircrew armor is a 30 caliber aluminum oxide hard faced composite system. Critical component protection, which protects a

hydraulic valve in the landing gear system, is dual property steel armor.

c. Due to the various aircraft and avionics configurations, different armor sub-kits are required for any one model. All OV-1A and OV-1C aircraft require five of these sub-kits, while the OV-1B requires only four. The extended side and floor armor sub-kit provided for the OV-1A and OV-1C is not used on OV-1B aircraft due to weight and balance considerations. Subsequently, the armor systems for the OV-1A and OV-1C model aircraft weigh 360 pounds as opposed to 180 pounds for the OV-1B.

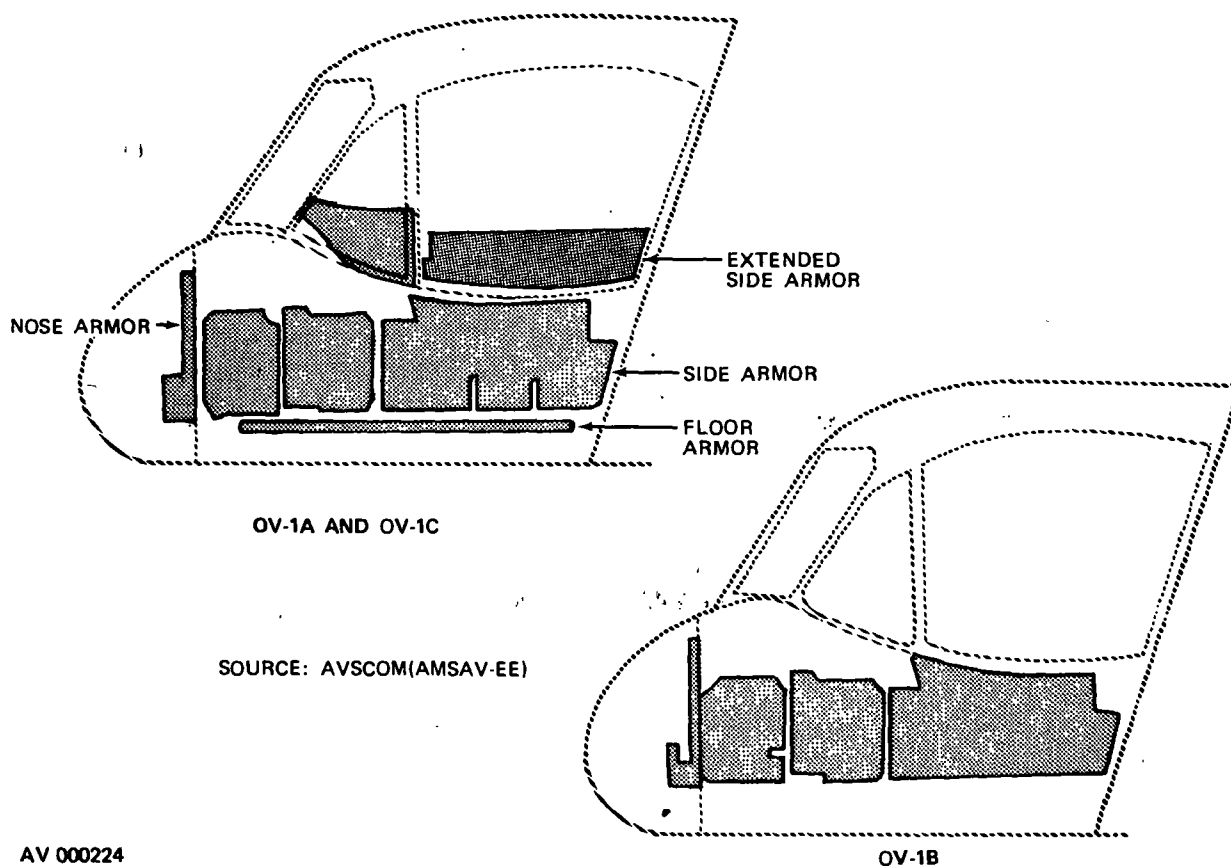


Figure 2-44. OV-1 Armor

Section III. FERRYING AND SHIPPING*

2-40. Surface Shipment.

Preparation of large numbers of aircraft for simultaneous mass movement by ocean transport had its inception in the latter part of June 1965.

Deployment of the 1st Cavalry Division (Airmobile) involved movement of a large number of aircraft, which was a first of this type and magnitude for the U. S. Army. Since the operation involved movement of approximately 500 aircraft, staging areas had to be established to receive, process, and marshal in

accordance with the numbers designated for each of four vessels. Ports of loading were designated as Brookley Air Force Base, Mobile, Ala., and Mayport Naval Base, Jacksonville, Fla., plus "Spraylat" capability at Naval Air Station, Jacksonville, Fla.

As a result of the experience with the deployment of the 1st Cavalry Division, certain time factors for preparation were evolved. This experience has been used in developing the following table relating to processing Army aircraft for surface shipment.

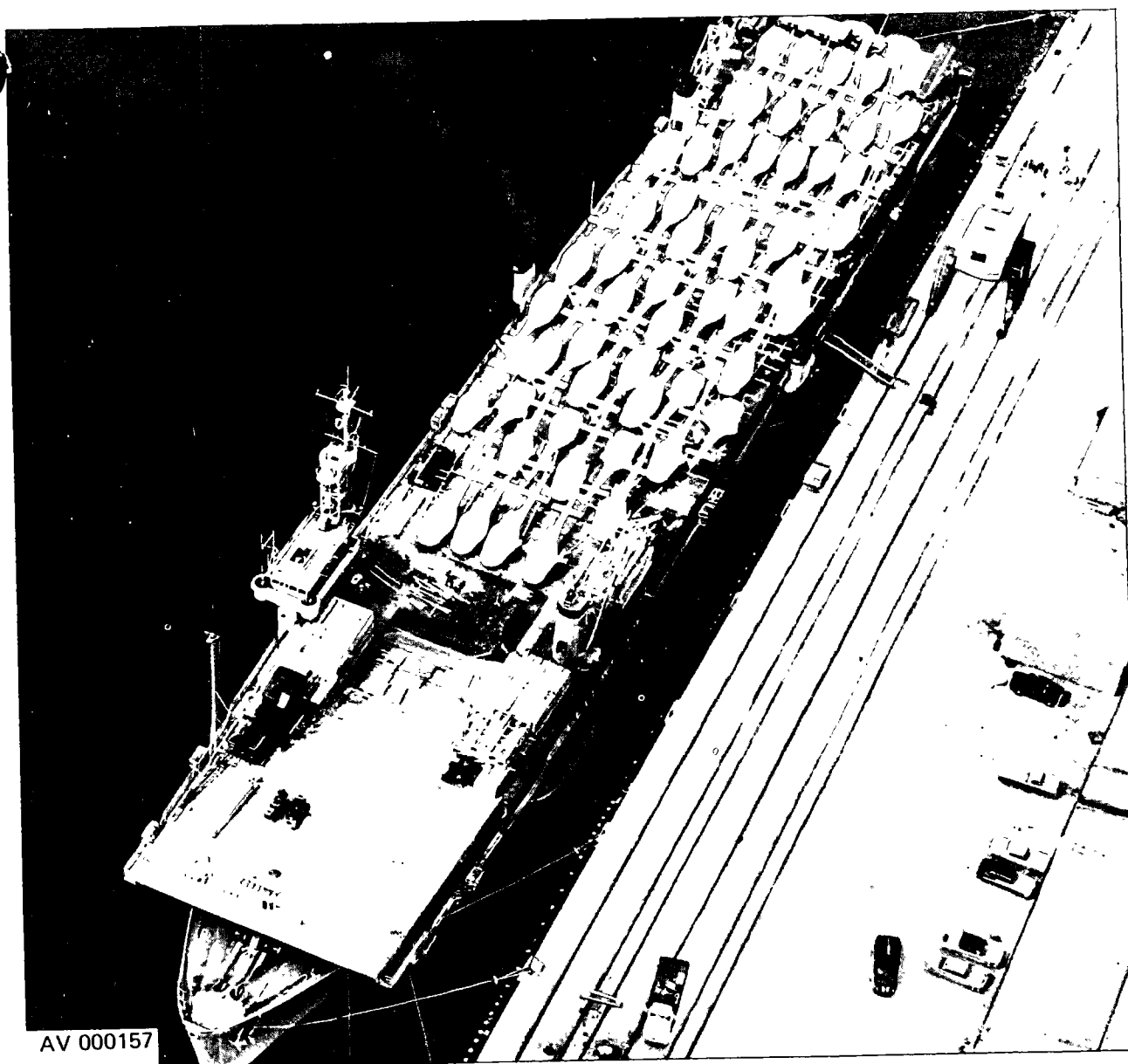


Figure 2-45. Aircraft loaded for surface shipment

2-41. Surface Shipment Processing Time.

TYPE OF AIR-CRAFT	DIRECT LABOR (MAN-HOURS REQUIRED TO PROCESS FOR OVERSEAS SHIPMENT <u>2</u> /)				ELAPSED TIME TO PROCESS (HOURS)				MAN-HOURS (M/H) AND ELAPSED TIME (ET) TO DEPROCESS								REFERENCED PUBLICATIONS
	TOP DECK LOADING		BELOW DECK LOADING		TOP DECK LOADING		BELOW DECK LOADING		BELOW DECK CRATED		BELOW DECK UN-CRATED		TOP DECK STRIP-PABLE COAT-ING		TOP DECK REUS-ABLE COVERS		
	STRIP COAT-ING	REUS-ABLE COVERS	CRATED	UN-CRATED	STRIP COAT-ING	REUS-ABLE COVER	CRATED	UN-CRATED	M/H	ET	M/H	ET	M/H	ET	M/H	ET	
4/AH-1G	90	55	3/	50	30	24	3/	24			10	10	25	10	15	10	TM 1-AH-1-S
4/CH-47A, 5/B/C	200	80 ¹	3/	60 3/	48	24	3/	3/	3/	3/	3/	3/	70	24	40	24	TM 1-CH47-S
4/CH-54A	200	80 1/	3/	3/	72	24	3/	3/	3/	3/	3/	3/	90	48	60	24	TM 1-CH54-S
OH-6A	3/	3/	90 3/	35	3/	1/3/	48 3/	24	40 3/	24 3/	6	12	3/	3/	3/	3/	TM 1-OH-6-S
OH-13, S, TH-13T	3/	3/	90 3/	35 3/	3/	3/	48 3/	24	40 3/	48 3/	6	12	3/	3/	3/	3/	TM 1-OH13-S
4/OH-58A	3/	3/	90 3/	32	3/	1/3/	40 3/	24	40 3/	24 3/	8	12	3/	3/	3/	3/	TM 1-OH58-S
4/UH-1, B, C, D, H, M	100	60 1/	3/	55	30	24	3/	24	3/	3/	12	12	30	12	16	12	TM 1-UH-1-S
O-1G	3/	3/	95	20	3/	3/	48	24	50	48	16	8	3/	3/	3/	3/	TM 1-O1-S

2-41. Surface Shipment Processing Time (CONT).

241. Surface Shipment Processing Time (CONT).																		
TYPE OF AIR-CRAFT	DIRECT LABOR (MAN-HOURS REQUIRED TO PROCESS FOR OVERSEAS SHIPMENT) ^{2/}				ELAPSED TIME TO PROCESS (HOURS)				MAN-HOURS (M/H) AND ELAPSED TIME (ET) TO DEPROCESS								REFERENCED PUBLICATIONS	
	TOP DECK LOADING		BELOW DECK LOADING		TOP DECK LOADING		BELOW DECK LOADING		BELOW DECK CRATED		BELOW DECK UN-CRATED		TOP DECK STRIP-PABLE COAT-ING		TOP DECK REUS-ABLE COVERS			
	STRIP COAT-ING	REUS-ABLE COVERS	CRATED	UN-CRATED	STRIP COAT-ING	REUS-ABLE COVER	CRATED	UN-CRATED	M/H	ET	M/H	ET	M/H	ET	M/H	ET		
U-8D, F.G, RU-8D	140	90 ^{1/}	^{3/}	60	48	24	^{3/}	24	^{3/}	^{3/}	50	24	70	24	40	24	TM 1-U8-S	
U-10A	125	60 ^{1/}	120	40	72	24	70	48	40	24	50	24	70	48	30	24	NVAL	
^{4/} U-21 RU-21	140	90 ^{1/}	^{3/}	60	48	24	^{3/}	24	^{3/}	^{3/}	50	24	70	24	40	24	TM 1-U21-S	
^{4/} OV-1A, B,C	140	90 ^{1/}	^{3/}	^{3/}	48	24	^{3/}	24	^{3/}	^{3/}	^{3/}	31	70	24	40	24	TM 1-OV1-S	
T-42A	150	80 ^{1/}	^{3/}	60	120	24	^{3/}	24	^{3/}	^{3/}	30	24	70	48	40	24	NVAL	

^{1/}Cover sets are not items of supply to be requisitioned. Only CONUS and overseas outloading points preparing aircraft for movement are authorized to request cover sets.

^{2/}M/H and ET do not include time to manufacture shipping crates.

^{3/}Not recommended

^{4/}If aircraft are scheduled for fly-off shipment, contact MSC (Military Sealift Command) for fuel restriction.

^{5/}If CH-47's are scheduled for fly-off delivery from MSC carriers, contact MSC for information on PSI/sq. ft. load factor of elevator and hanger deck.

2-42. Air Shipment and Ferrying.

AIRCRAFT TYPE	AIR SHIPMENT										FERRYING		
	AIR FORCE AIRCRAFT	REQUIRED DISASSEMBLY	REQUIREMENTS FOR DISASSEMBLY			REQUIREMENTS FOR REASSEMBLY			REFERENCED PUBLICATIONS	NO. OF ACFT CAN BE LOADED ^{8/}	AIRCRAFT MODEL	WITHOUT FERRY TANKS (N/M)	WITH FERRY TANKS (N/M)
			CREW	M/H	ET	CREW	M/H	ET					
AH-1G	C-124	Main rotor blades, mast assembly, tail rotor blades, Synch elevator, wings, Antennas	5	8	2	5	9	2.5	TM 1-AH1-S	2			
	C-141	Same plus fairings (Clean to fuselage).	5	12	4	5	14	5	TM 1-AH1-S	2			
	C-5A	Main rotor blades, stub wings, and synchronized elevators ⁸	4	6	2	4	10	3		12			
CH-47A,B, C	C-5A	Rotor blades, hubs, transmissions, pylons, engines	15	120	24	15	240	48	TM 1-CH-47-S	3		200	826
CH-54A/B	C-5A	Landing gear <u>11/</u> Rotor blades	12	160	14	14	220	36	TM 1-CH-54-S	2		320	NA
OH-6A	C-141	Rotor blades, horizontal stabilizers (as necessary)	3	3	2	3	4	2	TM 1-OH-6-S	6			
	C-130		3	3	3	3	4	2		3			
	C-124		3	3	2	3	4	2		6			
	C-5A		3	3	2	3	4	2		26			

2-42. Air Shipment and Ferrying (CONT).

AIRCRAFT TYPE	AIR SHIPMENT										FERRYING		
	AIR FORCE AIRCRAFT	REQUIRED DISASSEMBLY	REQUIREMENTS FOR DISASSEMBLY			REQUIREMENTS FOR REASSEMBLY			REFERENCED PUBLICATIONS	NO. OF ACFT CAN BE LOADED 8/	AIRCRAFT MODEL	WITHOUT FERRY TANKS (N/M)	WITH FERRY TANKS (N/M)
			CREW	M/H	ET	CREW	M/H	ET					
OH-13 S,TH- 13T	C-141	<u>7/</u>	4	3	2	4	2	1	TM 1-OH-13-S	3	S	214 165	NA NA
	C-130	<u>5/6/</u>	4	4	2	4	4	2		2			
	C-124	<u>7/</u>	4	3	2	4	2	1		4			
	C-5A	<u>5/</u>	4	3	2	4	2	1		10			
OH-58A	C-124	12 8	3	6	2	3	7	2	TM 1-OH58-S	4		350	NA
	C-130	7 8	3	6	2	3	7	2		2			
	C-141	2 8	3	6	2	3	7	2		4			
	C-5A	12 8	3	6	2	3	7	2		13			
UH-1B,C, D,H,M	C-130	<u>7/10/</u> Rotor blades, transmission, mast and hub	6	10	3	6	12	3	TM 1-UH1-1	1	C,M D,H	314 218	630 643
	C-124		6	10	3	6	12	3		2			
	C-141		6	14	5	6	16	5		2			
	C-5A		6	10	3	6	12	3	TM 55-450-3	9	B	234	609
O-1G	C-141	<u>1/</u>							T.O. 1C-141A-9 TM 1-L19-S	3	G	547 460 488	956 800 880
	C-130									2			
	C-124								TM 55-450-2	4			
	C-5A	<u>1/</u>	6	15	3	8	16	2		9			
U-8,RU-8	<u>4/</u>	Not applicable									D,G,RU-8 F	1136 1214	NVAL 1600
U-10		Not available this printing										NVAL	NVAL
U-21	<u>4/</u>	Not applicable									A,B,C,	300	1600
OV-1	<u>4/</u>	Not applicable											
T-42	<u>4/</u>	Not applicable										750	NVAL

242. Air Shipment and Ferrying (CONT).

SOURCE: AVSCOM (AMSAV-QT)

- 1/Wings, tail assembly, antenna
- 2/Landing gear in addition to 1/
- 3/Reduce width of landing gear
- 4/Not practical because of disassembly requirements
- 5/One main rotor blade and antenna
- 6/Disassemble one aircraft per 5/ and one aircraft per 7/ to load two aircraft in transport
- 7/Both main rotor blades, one tail rotor blade, stabilizer bar with mast assembly, antenna, and synchronized elevators, as applicable.
- 8/Numbers can be increased by further disassembly
- 9/Mast remains installed on last two AH-1G's loaded
- 10/Landing gear is replaced by a special transportability skid
- 11/Separate cockpit from fuselage at station 210
- 12/Both main rotor blades, horizontal stabilizers

NOTE: Current US Army TMs for air shipment are not always current with Air Force doctrine, nor do they reference appropriate military airlift command regulations. When FM 101-20 is used for planning, Computerized Air Planning Services (CAPS) at Langley Air Force Base or the nearest MAC command post should be asked to provide current policies

2-43. Weight and Cube for Crated Shipment.

TYPE OF AIRCRAFT	WEIGHT (LB)	CUBE (CU FT)
AH-1G	NVAL	NVAL
CH-47A	*	*
CH-47B	*	*
CH-47C	*	*
CH-54A	*	*
CH-54B	*	*
OH-6A	*	*
OH-13S	5,100	990
OH-58A	5,000	1,280
UH-1B	10,610	2,241
UH-1C	10,610	2,241
UH-1D	12,500	2,400
UH-1H	12,500	2,400
UH-1M	10,610	2,241
TH-13T	4,800	930
TH-55A	*	*
O-1G	3,800	1,430
U-8D	*	*
U-8F	*	*
U-8G	*	*
U-10A	NVAL	NVAL
U-21A	*	*
OV-1A	*	*
OV-1B	*	*
OV-1C	*	*
OV-1D	*	*
T-41B	*	*
T-42A	*	*

(*)Crating of aircraft not recommended

SOURCE: AVSCOM (AMSAV-QT)

Section IV. TOOLS*

2-44. Aircraft Shop Sets/Tool Kits/Tool Sets (Common).

2-45. Shop Sets.

NOMENCLATURE	SM/SC
Shop set, aircraft maintenance, ground handling and servicing, Set A, direct support (Army) (FSN 1730-999-6194)	SC 1730-99-CL-A01
Shop set, aircraft maintenance, ground handling and servicing, Set B, direct support (Army) (FSN 1730-999-6195)	SC 1730-99-CL-A02
Shop set, aircraft maintenance, ground handling and servicing, Set C, general support (Army) (FSN 1730-999-6193)	SC 1730-99-CL-A03
Shop set, aircraft ground handling and servicing, airmobile, direct support maintenance, Battalion GHS (FSN 1730-900-8316)	SC 1730-99-CL-A04
Shop set, aircraft maintenance, fixed base, flaw detection, Set A, direct support (FSN 4920-321-9353)	SC 4920-99-CL-A01
Shop set, aircraft maintenance, fixed base, sheet metal, Set A, direct support (Army) (FSN 4920-944-1005)	SC 4920-99-CL-A02
Shop set, aircraft maintenance, fixed base, sheet metal, Set B, direct support (Army) (FSN 4920-944-1006)	SC 4920-99-CL-A03
Shop set, aircraft, maintenance, fixed base, sheet metal, Set C, general support (Army) (FSN 4920-944-0996)	SC 4920-99-CL-A04
Shop set, aircraft maintenance, fixed base, hydraulic, Set A, direct support (FSN 4920-321-9363)	SC 4920-99-CL-A05
Shop set, aircraft maintenance, fixed base, hydraulic, Set B, direct support (FSN 4920-321-9364)	SC 4920-99-CL-A06

*Source: AVSCOM (AMSAV-FPX)

2-45. Shop Sets (CONT).

NOMENCLATURE	SM/SC
Shop set, aircraft maintenance, fixed base, hydraulic, Set C, general support (FSN 4920-321-9373)	SC 4920-99-CL-A07
Shop set, aircraft maintenance, fixed base, welding, Set A, direct support (FSN 4920-321-9375)	SC 4920-99-CL-A08
Shop set, aircraft maintenance, fixed base, welding, Set B, direct support (FSN 4920-321-9376)	SC 4920-99-CL-A09
Shop set, aircraft maintenance, fixed base, welding, Set C, general support (Army) (FSN 4920-944-0785)	SC 4920-99-CL-A10
Shop set, aircraft maintenance, fixed base, tool crib, Set A, direct support (FSN 4920-321-9397)	SC 4920-99-CL-A11
Shop set, aircraft maintenance, fixed base, tool crib, Set B, direct support (FSN 4920-321-9403)	SC 4920-99-CL-A12
Shop set, aircraft maintenance, fixed base, tool crib, Set C, general support (FSN 4920-321-9405)	SC 4920-99-CL-A13
Shop set, aircraft maintenance, fixed base, electrical, Set A, direct support (Army) (FSN 4920-944-0761)	SC 4920-99-CL-A14
Shop set, aircraft maintenance, fixed base, electrical, Set B, direct support (Army) (FSN 4920-944-0760)	SC 4920-99-CL-A15
Shop set, aircraft maintenance, fixed base, electrical, Set C, general support (Army) (FSN 4920-944-0757)	SC 4920-99-CL-A16
Shop set, aircraft maintenance, fixed base, flaw detection, Set B, direct support (FSN 4920-321-9410)	SC 4920-99-CL-A17
Shop set, aircraft maintenance, fixed base, flaw detection, Set C, general support (FSN 4920-321-9411)	SC 4920-99-CL-A18
Shop set, aircraft maintenance, fixed base, paint, Set B, direct support (Army) (FSN 4920-944-0759)	SC 4920-99-CL-A19
Shop set, aircraft maintenance, fixed base, paint, Set C, general support (Army) (FSN 4920-944-1007)	SC 4920-99-CL-A20
Shop set, aircraft maintenance, fixed base, instrument, Set B, direct support (FSN 4920-321-9416)	SC 4920-99-CL-A21

2-45. Shop Sets (CONT).

NOMENCLATURE	SM/SC
Shop set, aircraft maintenance, fixed base, instrument, Set C, general support (Army) (FSN 4920-944-0784)	SC 4920-99-CL-A22
Shop set, aircraft maintenance, fixed base, engine, Set B, direct support (Army) (FSN 4920-944-0884)	SC 4920-99-CL-A23
Shop set, aircraft maintenance, fixed base, engine, Set C, general support (Army) (FSN 4920-944-0786)	SC 4920-99-CL-A24
Shop set, aircraft maintenance, fixed base, propeller and rotor, Set B, direct support (Army) (FSN 4920-944-1014)	SC 4920-99-CL-A25
Shop set, aircraft maintenance, fixed base, propeller and rotor, Set C, general support (Army) (FSN 4920-944-1015)	SC 4920-99-CL-A26
Shop set, aircraft maintenance, fixed base, power train, general support (Army) (FSN 4920-944-0838)	SC 4920-99-CL-A27
Shop set, aircraft maintenance, semitrailer mounted, A-1, tool crib, electrical, flaw detection, direct support (FSN 4920-621-2032)	SC 4920-99-CL-A28
Shop set, aircraft maintenance, semitrailer mounted, A-2, sheet metal, welding, hydraulic, direct support (FSN 4920-621-2033)	SC 4920-99-CL-A29
Shop set, aircraft maintenance, semitrailer mounted, B-1, tool crib and flaw detection, direct support (FSN 4920-621-2034)	SC 4920-99-CL-A30
Shop set, aircraft maintenance, semitrailer and trailer mounted, B-2, electrical, instrument, and hydraulic, direct support (FSN 4920-621-2035)	SC 4920-99-CL-A31
Shop set, aircraft maintenance, semitrailer mounted, B-3, sheet metal and welding, direct support (FSN 4920-621-2036)	SC 4920-99-CL-A32
Shop set, aircraft maintenance, semitrailer mounted, B-4, machine and engine shop, direct support (FSN 4920-621-2037)	SC 4920-99-CL-A33

2-45. Shop Sets (CONT).

NOMENCLATURE	SM/SC
Shop set, aircraft maintenance, trailer mounted, B-6, paint shop, direct support (FSN 4920-621-2038)	SC 4920-99-CL-A34
Shop set, aircraft maintenance, semitrailer mounted, C-1, tool crib, general support (FSN 4920-621-2039)	SC 4920-99-CL-A35
Shop set, aircraft maintenance, semitrailer and trailer mounted, C-2, electrical shop, general support (FSN 4920-621-2040)	SC 4920-99-CL-A36
Shop set, aircraft maintenance, semitrailer mounted, C-3, flaw detection, general support (FSN 4920-621-2041)	SC 4920-99-CL-A37
Shop set, aircraft maintenance, semitrailer mounted, C-4, sheet metal, general support (FSN 4920-621-2042)	SC 4920-99-CL-A38
Shop set, aircraft maintenance, semitrailer mounted, C-5, welding, general support (FSN 4920-621-2043)	SC 4920-99-CL-A39
Shop set, aircraft maintenance, semitrailer mounted, C-6, machine shop, general support (FSN 4920-621-2044)	SC 4920-99-CL-A40
Shop set, aircraft maintenance, semitrailer mounted, C-7, engine and hydraulic, general support (FSN 4920-621-2045)	SC 4920-99-CL-A41
Shop set, aircraft maintenance, semitrailer mounted, C-8, instrument shop, general support (FSN 4920-621-2046)	SC 4920-99-CL-A42
Shop set, aircraft maintenance, trailer mounted, C-10, paint shop, general support (FSN 4920-621-2047)	SC 4920-99-CL-A43
Shop set, aircraft maintenance, semitrailer mounted, B-5, propeller and rotor, direct support (FSN 4920-649-7098)	SC 4920-99-CL-A44
Shop set, aircraft maintenance, semitrailer mounted, C-9, propeller and rotor, general support (FSN 4920-649-6509)	SC 4920-99-CL-A45
Shop set, aircraft maintenance, semitrailer mounted, C-11, power train, general support (FSN 4920-649-6510)	SC 4920-99-CL-A46

2-45. Shop Sets (CONT).

NOMENCLATURE	SM/SC
Shop set, aircraft maintenance, airmobile, direct support section, airmobile division (FSN 4920-906-9727)	SC 4920-99-CL-A47
Shop set, aircraft maintenance, airmobile, tool crib, direct support maintenance, Battalion set No. 1 (FSN 4920-906-9728)	SC 4920-99-CL-A48
Shop set, aircraft maintenance, airmobile, electrical, instrument, hydraulic, direct support maintenance, Battalion set No. 2 (FSN 4920-906-9729)	SC 4920-99-CL-A49
Shop set, aircraft maintenance, airmobile, sheet metal and welding, direct support, Battalion set No. 3 (FSN 4920-906-9730)	SC 4920-99-CL-A50
Shop set, aircraft maintenance, airmobile, machine and engine, direct support maintenance, Battalion set No. 4 (FSN 4920-906-9731)	SC 4920-99-CL-A51
Shop set, aircraft maintenance, airmobile, propeller and rotor, direct support maintenance, Battalion set No. 5 (FSN 4920-906-9732)	SC 4920-99-CL-A52
Shop set, aircraft maintenance, airmobile, flaw detection, direct support maintenance, Battalion set No. 6 (FSN 4920-906-9733)	SC 4920-99-CL-A53
Shop set, aircraft maintenance, airmobile, company size, direct support, CH-47 (FSN 4920-133-8157)	SC 4920-99-CL-A89
Shop set aircraft maintenance, airmobile, company size, direct support, CH-47/OH-6 (FSN 4920-133-8156)	SC 4920-99-CL-A89
Shop set, aircraft maintenance, airmobile, company size, direct support, UH-1 (FSN 4920-133-8154)	SC 4920-99-CL-A89
Shop set, aircraft maintenance, airmobile, company size, direct support, UH-1/OH-6 (FSN 4920-133-8158)	SC 4920-99-CL-A89
Shop set, aircraft maintenance, airmobile, company size, direct support, UH-1/OH-6/OV-1 (FSN 4920-133-8155)	SC 4920-99-CL-A89

2-46. Tool Kits

NOMENCLATURE	SM/SC
Tool kit, aircraft mechanic's, general (FSN 5180-323-4692)	SC 5180-99-CL-A01
Tool kit, airframe repairman's, Army aircraft (FSN 5180-323-4876)	SC 5180-99-CL-A02
Tool kit, hydraulic repairman's, Army aircraft (FSN 5180-323-4891)	SC 5180-99-CL-A03
Tool kit, propeller and rotor repairman's, Army aircraft (FSN 5180-323-4909)	SC 5180-99-CL-A04
Tool kit, instrument repairman's, Army aircraft (FSN 5180-323-4913)	SC 5180-99-CL-A05
Tool kit, electrical repairman's, Army aircraft FSN 5180-323-4915)	SC 5180-99-CL-A06
Tool kit, engine and power train repairman's, Army aircraft (FSN 5180-323-4944)	SC 5180-99-CL-A07
Tool kit, aircraft inspection, technical (FSN 5180-323-5114)	SC 5180-99-CL-A09
Tool kit, trainer, flight simulator, set No. 1 (FSN 5180-859-0556)	SC 5180-99-CL-A10
Tool kit, Army aircraft, crash investigation (FSN 5180-903-1049)	SC 5180-99-CL-A11

2-47. Tool Sets.

NOMENCLATURE	SM/SC
Tool set, aircraft maintenance, airmobile, UH-1, Organizational maintenance (FSN 4920-906-9739)	SC 4920-99-CL-A64
Tool set, aircraft maintenance, airmobile, CH-47, Organizational maintenance, airmobile division (FSN 4920-906-9740)	SC 4920-99-CL-A65
Tool set, aircraft maintenance, airmobile, OH-13, Organizational maintenance. (FSN 4920-906-9743)	SC 4920-99-CL-A68
Tool set, organizational maintenance, Army aircraft, Set A, (Army) (FSN 4920-944-0990),	SC 4920-99-CL-A71

2-47. Tool Sets (CONT).

NOMENCLATURE	SM/SC
Set A supplement (Army) (FSN 4920-944-0985),	SC 4920-99-CL-A71
Set B (Army) (FSN 4920-944-1003),	SC 4920-99-CL-A71
Set C (Army) (FSN 4920-944-1004)	SC 4920-99-CL-A71
Tool set, aircraft maintenance, airmobile, OH-6, Organizational maintenance (FSN 4920-947-3471)	SC 4920-99-CL-A77

2-48. Aircraft Special Tools.

AIRCRAFT	NOMENCLATURE	TM
AH-1G, . . . TH-1G	Direct Support, General Support and Depot Maintenance Repair Parts and Special Tools List: Helicopter, Attack AH-1G (BELL), Helicopter, Flight Trainer – TH-1G (Bell) FSN's 1520-999-9821 (AH-1G), 1520-804-3635 (TH-1G)	TM 55-1520-221-34P
CH-47A,B,C.	Direct Support, General Support, and Depot Maintenance Repair Parts and Special Tools List: Helicopter, Cargo Transport, CH-47 (VERTOL) FSN's 1520-633-6836 (CH-47A), 1520-990-2941 (CH-47B), 1520-871-7308 (CH-47C)	TM 55-1520-209-34P
CH-54A,B	Direct Support, General Support and Depot Maintenance Repair Parts and Special Tools List: Helicopter, Cargo Transport CH-54 (SIKORSKY) FSN's 1520-964-9601 (CH-54A), 1520-113-5776 (CH-54B)	TM 55-1520-217-34P
OH-6A . . .	Direct Support, General Support and Depot Maintenance Repair Parts and Special Tools List: Helicopter, Observation OH-6A (HUGHES) FSN 1520-918-1523 (OH-6A)	TM 55-1520-214-35P
OH-13S . . . TH-13T . . .	Direct Support, General Support, and Depot Maintenance Repair Parts and Special Tools Lists: Helicopter, Ob- servation OH-13 (BELL), 1520-973-1227 (OH-13S), 1520-760-3333 (TH-13T),	TM 55-1520-204-34P
OH-58A . . .	Direct Support, and General Support Maintenance Repair and Special Tools List: (including Depot Maintenance Repair Parts and Special Tools) Helicopter, Observation, OH-58A (Bell), FSN 1520-169-7137 (OH-58A)	TM 55-1520-228-34P
UH-1	Direct Support and General Support, Maintenance Repair	TM 55-1520-210-34P

2-48. Aircraft Special Tools (CONT).

AIRCRAFT	NOMENCLATURE	TM
B,C,D,H,M	Parts and Special Tools List: (including Depot Maintenance Repair Parts and Special Tools) Helicopter, Utility-Tactical Transport, UH-1B, UH-1C, UH-1D, UH-1H, UH-1M (BELL), FSN's 1520-713-9912 (UH-1B), 1520-997-8862 (UH-1C), 1520-859-2670 (UH-1D), 1520-087-7637 (UH-1H), 1520-809-2631 (UH-1M)	
TH-55A . . .		Commercial Manuals Only TM 55-1510-202-34P TO 1L-1F-4-2
O-1G	Direct Support and General Support, Maintenance Repair Parts and Special Tools List: Airplane, Observation O-1 and Airplane, Flight Trainer, TO-1 (CESSNA), FSN's 1510-924-8466 (O-1G)	
U-8D,F,G, . RU-8D	Direct Support, General Support, and Depot Maintenance Repair Parts and Special Tools List: Airplane, Utility, U-8, (BEECH) Airplane, Utility, Reconnaissance, RU-8D (BEECH) FSN's 1510-574-7938 (U-8D), 1510-701-2233 (U-8F), FSN 1510-912-4084 (U-8G), 1510-945-9998 (RU-8D)	TM 55-1510-201-34P
U-10A		AF T.O. 1U-10A-1 AF T.O. 1U-10A-2 AF T.O. 1U-10A-4 TM 55-1510-209-34P
U-21A,G . . RU-21A,B,C, D,E	Direct Support, General Support, and Depot Maintenance Repair Parts and Special Tools List: Airplane, Utility U-21A (BEECH) FSN's 1510-933-8223 (U-21A), 1510-140-1627 (U-21G), Airplane, Reconnaissance, Utility, 1510-587-3375 (RU-21A), 1510-878-4338 (RU-21B), 1510-878-4336 (RU-21C), 1510-804-3641 (RU-21D), 1510-453-9451 (RU-21E)	
U-21F	Beech Model A-100 Airplane	Commercial Manuals Only TM 55-1510-204-34P
OV-1A,B, . . C,D	Direct Support, General Support, and Depot Maintenance Repair Parts and Special Tools List: Airplane, Observation STOL, OV-1 (GRUMMAN), FSN's 1510-715-9378 (OV-1A), 1510-715-9379 (OV-1B), 1510-715-9380 (OV-1C), 1510-869-3654 (OV-1D)	
T-41B		Commercial Manual Only
T-42		Commercial Manual Only
Trainers 2-B-3, 2-B-3A 9E2A	Trainer, Flight Simulator 2-B-3 (Trainer Corp of America) 2-B-3A (Transdyne Corp) FSN 6930-602-5271 (2-B-3) 6930-751-8671 (2-B-3A) Organizational, Direct Support, General Support, and Depot Maintenance Manual, Ejection Seat Training Device (9E2A), FSN 6930-758-9791	2B3 55-6930 201-25P TM 55-6930-201-25P TM 55-6930-205-15

2-49. Aircraft Engine Special Tools.

ENGINE	APPLICABLE AIRCRAFT	NOMENCLATURE	TM
O-435-25 O-435-25A	OH-13S,TH-13T TH-13T	Direct Support, General Support and Depot Maintenance Repair Parts and Special Tools List: Engine, Aircraft, Reciprocating (LYCOMING) FSN's 2810-994-8877 (O-435-25), 2810-949-8268 (O-435-25A)	TM 55-2810-221-34P
O-470-11A O-470-11B	O-1 O-1	Direct Support and General Support Maintenance Repair Parts and Special Tools List: Engine, Aircraft, Reciprocating (CONTINENTAL), FSN's 2810-064-6520 (O-470-11A), 2810-857-3272 (O-470-11B)	TM 55-2810-219-34P TO 2R-0470-24
O-480-1B O-480-3A	U-8D,G RU-8D U-8F	Direct Support, General Support and Depot Maintenance Repair Parts and Special Tools List: Engine, Aircraft, Reciprocating (LYCOMING) FSN's 2810-109-4578 (O-480-1B), 2810-109-4577 (O-480-3A)	TM 55-2810-218-34P
T-53-L-9A T-53-L-11 T-53-L-11SA T-53-L-11B T-53-L-11C T-53-L-11D T-53-L-13 T-53-L-13A T-53-L-13B	UH-1B,D UH-1B,D UH-1B,D UH-1B,C,D UH-1B,D UH-1B,C,D UH-1H,AH-1G UH-1H,AH-1G,TH-1G UH-1H,AH-1G	Direct Support, General Support, and Depot Maintenance Repair Parts and Special Tools List: Engine, Aircraft, Turbine (LYCOMING) FSN's 2840-086-8438 (T-53-L-9A), 2840-858-5562 (T-53-L-11), 2840-875-9939 (T-53-L-11SA), 2840-999-6228 (T-53-L-11B), 2840-102-3967 (T-53-L-11C), 2840-102-3968 (T-53-L-11D), 2840-911-7685 (T-53-L-13), 2840-102-3969 (T-53-L-13A), 2840-134-4803 (T-53-L-13B)	TM 55-2840-229-34P NAVAIR 02B-15AC-4 TO 2J-T53-14
T-53-L-7 T-53-L-7A T-53-L-15 T-53-L-701	OV-1B OV-1B OV-1C OV-1D	Direct Support, General Support, and Depot Maintenance Repair Parts and Special Tools List: Engine, Aircraft, Reciprocating (LYCOMING) FSN's 2840-894-6509 (T-53-L-7), 2840-102-3966 (T-53-L-7A),	TM 55-2840-233-34P

2-49. Aircraft Engine Special Tools (CONT).

ENGINE	APPLICATION AIRCRAFT	NOMENCLATURE	TM
T-55-L-7 T-55-L-7B T-55-L-7C T-55-L-11 T-55-L-11A	CH-47A CH-47A CH-47B,C CH-47C CH-47C	2840-957-2853 (T-53-L-15), 2840-116-7134 (T-53-L-701) Direct Support, General Support, and Depot Maintenance Repair Parts and Special Tools List: Engine, Aircraft, Turboprop (LYCOMING) FSN's 2840-987-9717 (T-55-L-7), 2840-950-6875 (T-55-L-7B), 2840-937-0480 (T-55-L-7C), 2840-063-0801 (T-55-L-11), 2840-428-6382 (T-55-L-11A)	TM 55-2840-234-34P
T-62-T-2A T-62-T-2A1 T-62-T-16A1 T-62-T-16A2	CH-47A CH-47A,B,C CH-54A,B CH-54A,B	Direct Support, General Support, and Depot Maintenance Repair Parts and Special Tools List: Auxiliary Power Unit, Turbine Engine (SOLAR) FSN's 2835-906-6766 (T-62-T-2A), 2835-809-8316 (T-62-T-2A1), 2835-931-4775 (T-62-T-16A1), 2835-156-9785 (T-62-T-16A2)	TM 55-2835-203-34P
T-63-A-5A T-63-A-700	OH-6 OH-58	Direct Support, General Support, and Depot Maintenance Repair Parts and Special Tools List: Engine, Aircraft, Gas Turbine (ALLISON) FSN's 2840-923-6023 (T-63-A-5A), 2840-179-5536 (T-63-A-700)	TM 55-2840-231-34P
T-73-P-1 T-73-P-700	CH-54A CH-54B	Direct Support, General Support, and Depot Maintenance Repair Parts and Special Tools List: Engine, Aircraft, Free Turbine (PRATT and WHITNEY) FSN's 2840-904-2461 (T73-P-1), 2840-123-0682 (T73-P-700)	TM 55-2840-230-34P
T74-CP-700 T74-CP-702 PT-6A-20	RU-21A,D,E, U-21A,G RU-21B,C RU-21A,D,E U-21A,G	Direct Support, General Support, and Depot Maintenance Repair Parts and Special Tools List: Engine, Aircraft, Turboprop (PRATT and WHITNEY) 2840-855-6100 (T74-CP-700), 2840-707-3541 (T74-CP-702), 2840-933-8343 (PT-6A-20)	TM 55-2840-232-34P

Section V. INSPECTIONS

2-50. Aircraft Inspections.

TYPE OF AIRCRAFT	TM	TYPE OF AIRCRAFT	TM
AH-1G	TM 55-1520-221-PMD TM 55-1520-221-PMI TM 55-1520-221-PMP	OH-6A	TM 55-1520-214-20PMD TM 55-1520-214-20PMP
Inspection	Man-hours <u>1</u> /	Inspection	Man-hours <u>1</u> /
Daily	2.73	Daily	1.78
Intermediate	10.45	Periodic	41.43
Periodic	144.28		
CH-47A	TM 55-1520-209-PMD TM 55-1520-209-PMI TM 55-1520-209-PMP	OH-13S	TM 55-1520-225-PMD TM 55-1520-225-20PMI TM 55-1520-225-PMP
Inspection	Man-hours <u>1</u> /	Inspection	Man-hours <u>1</u> /
Daily	6.64	Daily	1.62
Intermediate	30.36	Intermediate	7.34
Periodic	260.54	Periodic	34.12
CH-47B,C	TM 55-1520-227-PMD TM 55-1520-227-PMI TM 55-1520-227-PMP	TH-13T	TM 55-1520-226-PMD TM 55-1520-226-PMI TM 55-1520-226-PMP
Inspection	Man-hours <u>1</u> /	Inspection	Man-hours <u>1</u> /
Daily	8.92	Daily	2.30
Intermediate	40.85	Intermediate	7.03
Periodic	181.66	Periodic	37.40
CH-54A	TM 55-1520-217-20PMD/1 TM 55-1520-217-20PMI/1 TM 55-1520-217-20PMP/1	OH-58A	TM 55-1520-228PMD TM 55-1520-228-PMP
Inspection	Man-hours <u>1</u> /	Inspection	Man-hours <u>1</u> /
Daily	10.99	Daily	1.46
Intermediate	37.74	Periodic	37.79
Periodic	260.99		
CH-54B	TM 55-1520-217-20PMD/2 TM 55-1520-217-20PMI/2 TM 55-1520-217-20PMP/2	UH-1B	TM 55-1520-219-PMP TM 55-1520-219-PMI TM 55-1520-219-PMP
Inspection	Man-hours <u>1</u> /	Inspection	Man-hours <u>1</u> /
Daily	7.00	Daily	1.00/1.40
Intermediate	32.00	Intermediate	3.10/5.70
Periodic	60.00	Periodic	60.00/86.50
		UH-1C,M	TM 55-1520-220-PMD TM 55-1520-220-PMI TM 55-1520-220-PMP
		Inspection	Man-hours <u>1</u> /
		Daily	2.29
		Intermediate	6.73
		Periodic	111.83

2-50. Aircraft Inspections (CONT).

TYPE OF AIRCRAFT	TM	TYPE OF AIRCRAFT	TM
UH-1D,H	TM 55-1520-210-PMD TM 55-1520-210-PMI TM 55-1520-210-PMP	U-8F	TM 55-1510-201-20PMD TM 55-1510-201-20PMI TM 55-1510-201-PMP
Inspection	Man-hours <u>1</u> / <u> </u>	Inspection	Man-hours <u>1</u> / <u> </u>
Daily	1.90	Daily	2.34
Intermediate	6.72	Intermediate	7.50
Periodic	115.99	Periodic	146.90
O-1	TM 55-1510-202-20PMD TM 55-1510-202-20PMI TM 55-1510-202-20PMP	U-10A	AF T.O. 1U-10A-6
Inspection	Man-hours <u>1</u> / <u> </u>	Inspection	Man-hours <u>1</u> / <u> </u>
Daily	1.06	Daily	0.45
Intermediate	4.97	Intermediate	1.05
Periodic	47.40	Periodic	44.00
OV-1A,B,C	TM 55-1510-204-20PMD TM 55-1510-204-20PMI TM 55-1510-204-20PMP	U-21A	TM 55-1510-209-PMD/1
Inspection	Man-hours <u>1</u> / <u> </u>	RU-21A	TM 55-1510-209-PMI/1
Daily	3.04	RU-21D	TM 55-1510-209-PMP/1
Intermediate	11.00	Inspection	Man-hours <u>1</u> / <u> </u>
Periodic	89.02	Daily	2.65
OV-1D	TM 55-1510-204-20PMD/1 TM 55-1510-204-20PMI/1 TM 55-1510-204-20PMP/1	Intermediate	10.73
Inspection	Man-hours <u>1</u> / <u> </u>	Periodic	131.14
Daily	2.04	TH-55A	Commercial Maintenance Manual
Intermediate	17.22	Inspection	Man-hours <u>1</u> / <u> </u>
Periodic	65.75	Daily	0.40
U-8D	TM 55-1510-201-20PMD TM 55-1510-201-20PMI TM 55-1510-201-PMP	Intermediate	1.00
Inspection	Man-hours <u>1</u> / <u> </u>	Periodic	25.00
Daily	2.18	U-21G	TM 55-1510-209-PMD/3
Intermediate	5.82	RU-21E	TM 55-1510-209-PMI/3
Periodic	91.13	TM 55-1510-209-PMP/3	
		Inspection	Man-hours <u>1</u> / <u> </u>
		Daily	2.65
		Intermediate	10.73
		Periodic	131.14
		RU-21B	TM 55-1510-209-PMD/2
		RU-21C	TM 55-1510-209-PMI/2
		TM 55-1510-209-PMP/2	
		Inspection	Man-hours <u>1</u> / <u> </u>
		Daily	2.95
		Intermediate	11.00
		Periodic	133.14

2-50. Aircraft Inspection (CONT).

TYPE OF AIRCRAFT	TM
U-21F	Beech Aircraft Commercial Manual 100-590028B

1 Inspection man-hours are based on world-wide average and do not include unscheduled maintenance.

NOTE: Check current DA PAM 310-4 for updated TMs.

Source: AVSCOM (AMSAV – LSA)

Section VI. FUEL AND OIL

2-51. Fuel and Oil Analysis.

TYPE AIRCRAFT	FUEL			OIL		
	GRADE <u>1</u> /	COST PER GAL <u>2</u> /	AVERAGE CONSUMPTION GAL/CRUISE HR	MIL-L- SPECIFI- CATION <u>1</u> /	COST PER QT <u>3</u> /	AVERAGE CONSUMPTION QT/CRUISE HR
AH-1G	JP-4/5	\$0.104	97.0	7808/23699	\$1.00	0.40
CH-47A	JP-4	0.104	452.0	23699	1.00	4.0
CH-47B	JP-4/5	0.104	452.0	23699	1.00	4.0
CH-47C	JP-4/5	0.104	450.0	23699	1.00	4.0
CH-54A	JP-4/5	0.104	470.0	23699	1.00	0.40
CH-54B	JP-4/5	0.104	445.0	23699	1.00	0.40
OH-6A	JP-4/5	0.104	29.0	23699	1.00	0.36
OH-13S	115/145	0.170	19.7	22851	0.21	0.48
OH-58A	JP-4	0.104	29.0	23699	1.00	0.20
UH-1B/C	JP-4/5	0.104	97.0	23699	1.00	0.40
UH-1D	JP-4/5	0.104	97.0	23699	1.00	0.40
UH-1H/M	JP-4	0.104	97.0	23699	1.00	0.40
TH-13	115/145	0.170	20.01	22851	0.21	0.48
TH-55A	115/145	0.170	10.0	22851	0.21	1.00
O-1G	115/145	0.170	9.0	22851	0.21	0.29
U-8D/RU-8D	115/145	0.170	31.4	22851	0.21	1.28
U-8F	115/145	0.170	30.0	22851	0.21	1.28
U-8G	115/145	0.170	31.4	22851	0.21	1.28
U-10A	115/145	0.170	17.0	22851	0.21	0.44
U-21A	JP-4/5	0.104	80.0	23699	1.00	0.20
RU-21A	JP-4/5	0.104	80.0	23699	1.00	0.20
RU-21B	JP-4/5	0.104	82.0	23699	1.00	0.20
RU-21C	JP-4/5	0.104	82.0	23699	1.00	0.20

2-51. Fuel and Oil Analysis (CONT).

TYPE AIRCRAFT	FUEL			OIL		
	GRADE <u>1/</u>	COST PER GAL <u>2/</u>	AVERAGE CONSUMPTION GAL/CRUISE HR	MIL-L. SPECIFI- CATION <u>1/</u>	COST PER QT <u>3/</u>	AVERAGE CONSUMPTION QT/CRUISE HR
RU-21D	JP-4/5	0.104	80.0	23699	1.00	0.20
U-21G	JP-4/5	0.104	80.0	23699	1.00	0.20
RU-21E	JP-4/5	0.104	80.0	23699	1.00	0.20
U-21F	JP-4/5	0.104	85.0	23699	1.00	0.20
OV-1A	JP-4/5	0.104	190.0	23699	1.00	0.80
OV-1B	JP-4/5	0.104	190.0	23699	1.00	0.80
OV-1C w/L-15	JP-4/5	0.104	190.3	23699	1.00	0.80
OV-1D	JP-4/5	0.117	190.3	23699	1.00	0.80
T-41B	115/145	0.170	6.1	None	0.21	0.04
T-42A	115/145	0.170	27.6	None	0.21	0.08

NOTE 1: Fuel consumption rate is based on 75% normal rated power. Oil consumption rates do not include the oil used during scheduled oil change. The scheduled oil change intervals are established by local theatre commander. If a 100-hour oil change interval is established, the above oil consumption rates can be multiplied by 150 for turbine engine powered aircraft or by 110 for reciprocating engine powered aircraft to obtain the approximate quantity of oil used (consumption and drain) for each 100 hours of operation. If oil change intervals other than 100 hours are established, different factors must be used. For example, the CH-47B has an oil consumption rate of 4.0 quarts/hour, 150 times 4.0 equals 600 quarts of oil that would be used (consumption and drain) for a 100 hour drain period.

NOTE 2: Check the applicable Operator's Manual for exact performance data on specific aircraft.

Source: AVSCOM (AMSAV-EE)

DATA SOURCE: 1/ TB 55-9150-200-25, Engine and Transmission Oils, Fuels, and Additives for Army Aircraft.

2/ AFLC CMAL No. 70-2, Standard prices for Aviation Fuels.

3/ Federal Supply Catalog, C-ML-A, Army Management Data List, and Defense General Supply Center.

Section VII. MAINTENANCE MAN-HOURS

2-52. Total Direct and Indirect Maintenance Man-Hour per Flight Hour.

TYPE AIRCRAFT	ORGANIZA- TIONAL MAINT	DS MAINT	GS MAINT	TOTAL
AH-1G	4.05	2.62	2.18	8.85
CH-47A	12.73	10.74	7.85	31.32
CH-47B	12.32	8.36	6.43	27.10
CH-47C	11.30	12.31	8.85	32.45
CH-54	17.81	7.85	5.66	31.32
OH-6A	2.25	2.81	.67	5.74
OH-13	2.65	2.20	1.78	6.62
OH-58A	2.25	2.81	.67	5.74
UH-1B/C/M	3.35	2.79	2.30	8.43
UH-1D/H	3.25	2.41	2.02	7.67
O-1	2.20	.74	.60	3.54
OV-1A	6.75	5.84	3.93	16.52
OV-1B	5.47	2.83	2.03	10.33
OV-1C	5.53	3.15	2.23	10.91
U-8/RU-8	5.73	3.19	1.62	10.54
U-10	2.20	.74	.60	3.54
U-21/RU-21 ...	4.19	2.34	1.51	8.04

NOTE: The above maintenance man-hour per flight hour factors include both direct and indirect labor. Indirect labor is 0.4 times (40%) direct labor.

These factors do not include avionics and weapons systems maintenance man-hours.

These figures do not include the man-hours expended on unscheduled maintenance.

Source: AVSCOM (AMSAV-FP)

2-53. Direct and General Support Aviation Maintenance Units.

UNIT		PRODUCTIVE MAINTENANCE MAN-HOURS PER YEAR (BASED ON 2700 HR PRODUCTION/MAN/YEAR)	
TOE 55-89	TRANSPORTATION AIRCRAFT, MAINTENANCE COMPANY, MAINTENANCE BATTALION, INFANTRY DIVISION (DIRECT SUPPORT)	54,000	AIRCRAFT COMPONENT REPAIR
		75,000	AIRCRAFT REPAIR
		21,600	AIRCRAFT ARMAMENT REPAIR
		5,400	AIRCRAFT FIRE CONTROL REPAIR
		40,500	AVIONICS REPAIR
TOE 55-99	TRANSPORTATION AIRCRAFT MAINTENANCE COMPANY, MAINTENANCE BATTALION, AIRBORNE DIVISION (DIRECT SUPPORT)	51,300	AIRCRAFT COMPONENT REPAIR
		75,600	AIRCRAFT REPAIR
		10,800	AIRCRAFT ARMAMENT REPAIR
		10,800	AVIONICS REPAIR
TOE 55-407	TRANSPORTATION AIRCRAFT, MAINTENANCE COMPANY, MAINTENANCE BATTALION, AIRMOBILE DIVISION (DIRECT SUPPORT)	94,500	AIRCRAFT COMPONENT REPAIR
		91,800	AIRCRAFT REPAIR
		32,400	AIRCRAFT ARMAMENT REPAIR
		16,200	AIRCRAFT FIRE CONTROL REPAIR
		105,300	AVIONICS REPAIR
TOE 55-424	TRANSPORTATION AIRCRAFT MAINTENANCE COMPANY, MAINTENANCE BATTALION, ARMORED OR INFANTRY DIVISION (MECHANIZED) (DIRECT SUPPORT)	32,400	AIRCRAFT COMPONENT REPAIR
		48,600	AIRCRAFT REPAIR
		10,800	AIRCRAFT ARMAMENT REPAIR
		24,300	AVIONICS REPAIR
TOE 55-457	TRANSPORTATION AIRCRAFT DIRECT SUPPORT COMPANY	116,640	AIRCRAFT COMPONENT REPAIR
		174,960	AIRCRAFT REPAIR
		21,600	AIRCRAFT ARMT & FC REPAIR
		43,200	AVIONICS REPAIR
TOE 55-458	TRANSPORTATION AIRCRAFT MAINTENANCE GENERAL SUPPORT COMPANY	241,380	AIRCRAFT COMPONENT REPAIR
		160,920	AIRCRAFT REPAIR
		32,400	ACFT ARMT & FC REPAIR
		64,800	AVIONICS REPAIR
TOE 55-570	ACFT MAINT TEAMS		
	TEAM KA, ACFT REP AUG (DIRECT SUPPORT)	5,400	AIRCRAFT REPAIR
	TEAM KB, ACFT COMP REP (DIRECT SUPPORT)	5,400	AIRCRAFT COMPONENT REPAIR
	TEAM KC, ACFT DS DET, AUG	(NON-PROD MAINT, SUP, INSP, SUPV)	
	TEAM KD, ACFT DS DET, SMALL	32,400	AIRCRAFT COMPONENT REPAIR
		16,200	AIRCRAFT REPAIR
		5,400	AIRCRAFT ARMAMENT REPAIR
	TEAM KE, ACFT DS DET, MEDIUM	54,000	AIRCRAFT COMPONENT REPAIR
		35,100	AIRCRAFT REPAIR
		5,400	AIRCRAFT ARMAMENT REPAIR
		5,400	AVIONICS REPAIR

2-53. Direct and General Support Aviation Maintenance Units (CONT).

UNIT	PRODUCTIVE MAINTENANCE MAN-HOURS PER YEAR (BASED ON 2700 HR PRODUCTION/MAN/YEAR)	
TEAM KF, MEDIUM CARGO HELICOPTER DIRECT SUPPORT DETACHMENT	67,500	AIRCRAFT COMPONENT REPAIR
	70,200	AIRCRAFT REPAIR
	10,800	AVIONICS REPAIR

Source: AVSCOM (AMSAV-QNA)

Section VIII. MAINTENANCE CATEGORIES**2-54. The Four Categories of Maintenance are:****a. Organization:**

Functions and repairs performed by using organizations within the capabilities of authorized personnel, skills, tools and test equipment as prescribed in appropriate TOE or TDA (AR 750-1).

b. Direct Support

Repair of end items or unserviceable assemblies in support of using organizations on a return to user basis.

c. General Support

Repair or overhaul materiel to required maintenance standards in a ready to issue condition based upon applicable supported Army area supply requirements.

d. Depot

Provide for the repair/overhaul of materiel beyond the capability of general support maintenance organizations.

2-55. Installations with Capabilities to Perform Aeronautical Depot Maintenance.

ARMY DEPOT	LOCATION
ARADMAC New Cumberland *Sharpe *Atlanta	Corpus Christi, Texas Harrisburg, Pennsylvania Lathrop, California Forest Park, Georgia

*Limited Capabilities

Source: AVSCOM (AMSAV-FP)



CHAPTER 3

PERSONNEL REQUIREMENTS*

Section I. OFFICER/WARRANT OFFICER AVIATION PERSONNEL REQUIREMENTS

3-1. Officer/Warrant Officer Requirements.

Requirements for officer and warrant officer aviators are determined by an analysis of the position to be filled and the function to be performed for projected aviation elements in the force structure. To this basic requirement, currently approved factors for transients, patients, student, and non-aviation (ground-duty) assignments must be added.

3-2. Positioning Criteria.

AR 570-1 contains criteria for, and lists positions where commissioned officers are authorized. Under these criteria, positions entailing essential command, staff, or supervisory functions for which an officer is especially required are so designated. All other positions are designated as warrant officer.

3-3. Cockpit Seat Fill Requirements.

Cockpit seat-fill requirements vary with the type of aircraft and the mission of the unit. At least the minimum crew complement prescribed in the operations handbook for a particular aircraft is authorized except for proficiency, contractor operated, and maintenance float aircraft for which no Army aviators are programmed. In general, dual control aircraft in combat, combat support units, and indirect support

units will be manned with pilots and copilots to give the unit a sustained operational capability. Dual control aircraft assigned in certain indirect support categories may not require copilots unless flight must be performed routinely under instrument conditions.

General criteria for aircraft manning are:

AIRCRAFT	PILOTS PER AIRCRAFT*
AH-1G	2
CH-47	2
CH-54	3
OH-6	1
OH-58A	1
OH-13	1
UH-1	2
O-1	1
U-8/9/21	2
U-10	1
OV-1	1
* The number of pilots reflected in manning tables for indirect support aircraft may be reduced proportionally when copilots can be provided from staff aviators authorized within the same manning document.	
Source: DA, OPO	

Section II. COMPUTATION OF ENLISTED AVIATION
MAINTENANCE PERSONNEL TRAINING REQUIREMENTS

3-4. General.

a. This section provides staff officers and aircraft maintenance officers with uniform guidance to accomplish the following:

(1) Evaluate manpower requirements for TOE/TD units as pertains to user and support maintenance activities.

(2) Determine manpower requirements in connection with procurement of aircraft maintenance services.

b. A relationship exists between the flying hours accumulated on aircraft and the man-hours of maintenance required for its continued serviceability. The relationship is termed man-hour per flight-hour ratio (MH/FH) and prevails in both user and support level maintenance. The ratio varies by type and model of aircraft, depending on aircraft size and complexity.

3-5. TOE Manpower Authorization Criteria for Aircraft Maintenance (Organizational).

a. Formula: Maintenance factor multiplied by the density of aircraft and the programmed monthly flying hours equals the number of mechanic/crew chief positions authorized.

b. Criteria:

Maintenance Factor	X	Density of Aircraft	X	Monthly Flying Hours	=	Number Crew Chief/Mechanic Positions
REFERENCE: AR 570-2						

3-6. TOE Manpower Authorization for Aircraft Maintenance (Direct/General Support).

a. Available Maintenance Manhours (Reference AR 570-2):

b. Authorization Criteria and Formula:

(1) Formula: Density of aircraft to be supported, multiplied by the maintenance man-hour-

per-flight-hour factor, the monthly programmed flying hours, the percentage of MOS, and the percentage of distribution of MOS, divided by the manhour availability factor, equals the number of aircraft repairmen positions authorized.

(2) Criteria:

Density of Aircraft	X	Maintenance Man-hours/Flight-Hour	X	Monthly Flying Hours	X	Percent of MOS	X
Distribution of MOS	÷	Monthly Man-hour Availability Factor	=	Number of Repairmen Authorized			
EXAMPLE: 100 UH-1, Direct Support, 70 flying hours per month							
<u>100 X 2.10 X 70 X 0.40 X 0.327 (68B Eng MOS)</u>				=	10.682 = 11 MOS 68B		
180					Repairmen Authorized		
REFERENCE: AR 570-2							

3-7. Unit Categories.

CATEGORY I – Unit organized under table of organization and equipment whose mission includes the seizing and holding of ground, in addition to destroying the enemy, and its corresponding headquarters and service companies, together with a unit whose mission includes destruction of the enemy in support of, or assistance to, the ground gaining troops by fire or other tactical support. Unit operates habitually in the forward portion of the active combat area.

CATEGORY II – Unit organized under table of organization and equipment whose mission includes support and assistance of a non-

-tactical nature to Category I units in the forward active portion of the combat area. It is found habitually forward of the army rear boundary and is normally assigned to division, corps, or army.

CATEGORY III – Unit organized under table of organization and equipment whose mission includes service and operations in support of a combat area and the operating agencies of a communication zone. The unit is found normally in the communication zone or along the lines of communication leading thereto, to include the Continental United States.

3-8. Enlisted MOS Applicable to Aircraft Types.

CURRENT MOS	DESCRIPTION	CATEGORY		AIRCRAFT APPLICABLE
		USER	SUPPORT	
35K	Avionics Mechanic	X		All
35L	Avionic Communication Equipment Repairman		X	All
35M	Avionic Navigation Equipment Repairman		X	All
35N	Avionic Flight Control Equipment Repairman		X	All
35P	Avionic Equipment Maintenance Chief		X	All
45J	Aircraft Armament Repairman	X	X	All
45M	Aircraft Armament Subsystem Mechanic	X		All
67A	Aircraft Maintenance Crewman	X	X	All
67B	O-1 Airplane Repairman	X		O-1
67F	Airplane Technical Inspector	X	X	All FW
67G	U-8/U-21 Airplane Repairman	X	X	U-8, U-21
67H	OV-1 Airplane Repairman	X	X	OV-1
67M	OH-13/OH-23 Helicopter Repairman	X	X	OH-13
67N	UH-1 Helicopter Repairman	X	X	UH-1
67U	CH-47 Helicopter Repairman	X	X	CH-47
67V	OH-6/OH-58 Helicopter Repairman	X	X	OH-6, OH-58
67W	Helicopter Technical Inspector	X	X	All RW
67X	CH-54 Helicopter Repairman	X	X	CH-54
67Y	AH-1G Helicopter Repairman	X	X	AH-1G
67Z	Aircraft Maintenance Supervisor		X	All

3-8. Enlisted MOS Applicable to Aircraft Types. (CONT).

CURRENT MOS	DESCRIPTION	CATEGORY		AIRCRAFT APPLICABLE
		USER	SUPPORT	
68A	Aircraft Components Repair Apprentice		X	All
68B	Aircraft Turbine Engine Repairman		X	All
68C	Aircraft Reciprocating Engine Repairman		X	All
68D	Aircraft Powertrain Repairman		X	All
68E	Rotor and Propeller Repairman		X	All
68F	Aircraft Electrician		X	All
68G	Airframe Repairman		X	All
68H	Aircraft Hydraulics Repairman		X	All

CHAPTER 4

COSTS

Section I. ARMY AIRCRAFT COSTS PER FLYING HOUR

4-1. Program 2 Flying Hour Cost Factors.

(\$ per FH)

AIRCRAFT	WORLDWIDE LESS RVN			RVN		
	PARTS ASF	POL	TOTAL	PARTS ASF	POL	TOTAL
<u>Fixed Wing</u>						
O-1	NA	NA	NA	13	2	15
OV-1	65	14	79	92	14	106
U-8/G	25	6	31	40	6	46
U-10	24	3	27	NA	NA	NA
U-21	25	7	32	40	7	47
T-41	20	1	21	NA	NA	NA
T-42	25	3	28	NA	NA	NA
<u>Rotary Wing</u>						
OH-6	26	4	30	40	4	44
OH-58	26	4	30	31	4	35
OH-13	18	3	21	NA	NA	NA
CH-47	135	33	168	226	33	259
CH-54	170	59	279	300	59	359
UH-1	33	7	40	51	7	58
AH-1G	35	8	43	54	8	62
TH-13T	13	3	16	NA	NA	NA

NA – Not applicable

Source: DA-COMPT-CA

Section II. AIRCRAFT UNIT FLYAWAY COSTS

4-2. Rotary Wing Unit Price.^{1/}

HELICOPTER	FEDERAL STOCK NUMBER	LINE ITEM NUMBER	TYPE	STANDARD PRICE ^{2/}
AH-1G	1520-999-9821	K29660	Attack	509,833
CH-47A	1520-633-6836	K30378	Cargo Transport	990,717
CH-47B	1520-990-2941	K30383	Cargo Transport	1,063,448
CH-47C	1520-871-7308	NVAL	Cargo Transport	2,026,200
CH-54A	1520-964-9601	K30515	Cargo Transport	2,134,466
CH-54B	1520-113-5776	K30515	Cargo Transport	2,343,131
OH-6A	1520-918-1523	K30645	Observation	109,221
OH-13S	1520-973-1227	K30746	Observation	55,640
OH-58A	1520-169-7137	K31042	Observation	104,461
UH-1B	1520-713-9912	K31749	Utility	244,760
UH-1C	1520-997-8862	K31767	Utility	224,415
UH-1D	1520-859-2670	K31786	Utility	237,504
UH-1H	1520-087-7637	K31795	Utility	244,345
UH-1M	1520-809-2631	Z33550	Utility	247,758
TH-13T	1520-760-3333	K29797	Basic Instrument Trainer	62,700
TH-55A	1520-758-0289	K31153	Primary Trainer	35,590

^{1/}Costs of armament systems not included. Refer to chapter 2.^{2/}Published in DA Supply Bulletin 700-20; Army Adopted/Other Selected Items and List of Reportable Items.

Source: AVSCOM (AMSAV-QPD)

4-3. Fixed Wing Unit Price. 1/

AIRCRAFT	FEDERAL STOCK NUMBER	LINE ITEM NUMBER	TYPE	STANDARD PRICE <u>2/</u>
O-1G	1510-924-8466	A30132	Observation	34,845
U-8D	1510-574-7938	A30721	Utility	115,250
U-8F	1510-701-2233	A30821	Utility	144,593
U-8G	1510-912-4084	A30831	Utility	114,687
RU-8D	1510-945-9998	A30465	Reconnaissance Utility	295,250
	1510-769-3114	A30521	Reconnaissance Utility APS85	295,250
U-10A	1510-964-9780	A30971	Utility STOL	55,824
U-21A	1510-933-8223	A30946	Utility	348,844
U-21F	1510-169-0295	Z04608	Utility	453,000
U-21G	1510-140-1627	Z04613	Utility	297,814
RU-21A	1510-587-3375	Z94566	Reconnaissance Utility	587,004
RU-21B	1510-878-4338	A30583	Reconnaissance Utility	1,257,811
RU-21C	1510-878-4336	A30584	Reconnaissance Utility	1,259,760
RU-21D	1510-804-3641	A30585	Reconnaissance Utility	875,000
RU-21E	1510-453-9451	A30586	Reconnaissance Utility	1,070,474
OV-1A	1510-715-9378	A30171	Observation STOL	866,555
OV-1B	1510-715-9379	A30221	Observation STOL	976,437
OV-1C	1510-715-9380	A30271	Observation STOL	1,058,540
OV-1D	1510-869-3654	A30296	Observation STOL	2,033,066
T-41B	1510-929-1012	A30053	Trainer, Flight	16,200
T-42A	1510-872-7908	K30596	Trainer, Instrument	55,072

1/Cost of armament systems not included. Refer to chapter 2.2/Published in DA Supply Bulletin 700-20, Army Adopted/Other Selected Items and List of Reportable Items.

Source: AVSCOM (AMSAV-QPD)

4-4. Avionics Estimated Maintenance Cost Factors.

AVIONICS EQUIPMENT OR SYSTEM	ESTIMATED LABOR COST (\$)				ESTIMATED PARTS COST (\$)		
	ORG	FIELD	HEAVY	DEP	FIELD	HEAVY	DEP
A-25A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A-339D-1	5.61	13.46	20.20	224.40	8.98	13.46	39.27
AM-3209/ASN	1.17	NR	NR	49.25	NR	NR	6.35
AM-6279/ASW	60.00	N/A	N/A	N/A	N/A	N/A	N/A
AM-6280/ASW	6.00	N/A	N/A	N/A	N/A	N/A	N/A
AM-12049	N/A	N/A	N/A	N/A	N/A	N/A	N/A
AN/AAS-14()	250.00	NR	NR	10000.00	NR	NR	1750.00
AN/AAS-24()	29.00	NR	NR	1165.45	NR	NR	203.95
AN/AAS-29	100.00	NR	NR	4000.00	NR	NR	700.00
AN/ADR-6	24.00	58.19	87.28	969.80	38.79	58.19	169.72
AN/AJA-5()	12.50	30.00	45.00	221.38	26.00	30.00	100.00
AN/AKT-18	11.00	NR	NR	5625.00	NR	NR	1200.00
AN/ALQ-67	N/A	N/A	N/A	N/A	N/A	N/A	N/A
AN/ALQ-80	300.00	720.00	1080.00	12000.00	480.00	720.00	2100.00
AN/APN-22	8.00	19.58	29.37	443.13	13.06	19.58	65.28
AN/APN-158()	59.00	141.05	211.57	1978.50	94.03	141.05	428.52
AN/APN-171V()	27.50	66.00	99.00	1100.00	44.00	66.00	192.50
AN/ARC-111	5.00	11.99	17.98	450.50	7.99	11.99	41.60
AN/ARC-114	6.73	16.14	24.21	375.00	10.76	16.14	90.00
AN/ARC-115	6.35	15.00	22.50	375.00	10.00	15.00	90.00

4-4. Avionics Estimated Maintenance Cost Factors (CONT).

AVIONICS EQUIPMENT OR SYSTEM	ESTIMATED LABOR COST (\$)				ESTIMATED PARTS COST (\$)		
	ORG	FIELD	HEAVY	DEP	FIELD	HEAVY	DEP
AN/ARC-116	5.65	13.56	20.34	375.00	9.04	13.56	90.00
AN/ARC-131	15.28	36.67	55.01	611.30	24.45	36.67	106.98
AN/ARC-134()	12.31	29.54	44.32	492.40	19.70	29.54	86.17
AN/ARN-30()	8.90	20.50	30.74	604.38	13.60	20.50	111.02
AN/ARN-32	1.03	2.46	3.69	41.00	1.64	2.46	7.18
AN/ARN-59	6.65	15.96	23.94	171.88	10.64	15.96	20.00
AN/ARN-82	9.37	22.49	33.73	374.80	14.99	22.49	65.59
AN/ARN-83	8.19	19.66	29.48	604.38	13.10	19.66	60.92
AN/ARN-89	10.89	26.14	39.20	562.50	17.42	26.14	110.00
AN/ART-41A	30.00	NR	NR	1200.00	NR	NR	210.00
AN/ASH-19	27.50	66.00	99.36	1100.00	44.16	66.00	192.50
AN/ASH-23	17.57	42.16	63.23	702.70	28.10	42.16	122.97
AN/ASN-13	11.07	26.56	39.83	375.63	17.70	26.56	79.60
AN/APR-25(V)	64.00	153.00	229.57	2550.00	102.00	153.00	446.25
AN/APR-26(V)	12.50	30.00	45.00	5.00	20.00	30.00	87.50
AN/APR-36	N/A	N/A	N/A	N/A	N/A	N/A	N/A
AN/APR-37	N/A	N/A	N/A	N/A	N/A	N/A	N/A
AN/APS-94()	9.00	NR	NR	353.66	NR	NR	61.89
AN/APX-44()	11.00	26.64	39.96	409.63	17.76	26.64	40.34
AN/APX-72	15.50	37.20	55.80	620.00	24.80	37.20	159.36
AN/ARA-31	.89	2.14	3.20	35.60	1.42	2.14	6.23
AN/ARA-56	.17	.40	.59	6.59	.26	.40	1.15

4-4. Avionics Estimated Maintenance Cost Factors (CONT).

AVIONICS EQUIPMENT OR SYSTEM	ESTIMATED LABOR COST (\$)				ESTIMATED PARTS COST (\$)		
	ORG	FIELD	HEAVY	DEP	FIELD	HEAVY	DEP
AN/ARC-44	9.00	21.26	31.88	814.13	14.17	21.26	61.24
AN/ARC-45	19.00	45.60	68.40	320.10	30.40	45.60	125.00
AN/ARC-54	23.50	56.12	84.11	364.38	37.38	56.12	349.36
AN/ARC-51BX	21.00	50.74	76.46	329.37	33.98	50.74	319.16
AN/ARC-55()	11.20	26.88	40.32	466.38	17.92	26.88	67.24
AN/ARC-60()	5.80	13.92	20.88	442.50	9.28	13.92	25.95
AN/ARC-73()	10.09	24.22	36.32	1218.13	16.14	24.22	177.56
AN/ARC-102	27.80	66.72	106.08	1194.50	44.48	66.72	220.29
AN/ASN-23	38.40	92.16	138.24	1250.00	61.44	92.16	500.00
AN/ASN-33	9.05	81.71	122.56	1361.80	54.47	81.71	238.32
AN/ASN-43	14.11	N/A	N/A	564.20	N/A	N/A	98.74
AN/ASN-62	20.00	48.00	72.00	800.00	32.00	48.00	140.00
AN/ASN-64	181.62	N/A	N/A	7264.60	N/A	N/A	1271.31
AN/ASN-76	46.32	N/A	N/A	1852.80	N/A	N/A	324.24
AN/ASN-86	719.25	1726.20	2589.30	28770.00	1150.80	1726.20	5034.75
AN/ASQ-132	N/A	N/A	N/A	N/A	N/A	N/A	N/A
AN/ASW-12(V)	126.36	303.25	454.88	3075.00	202.17	303.25	1280.00
AN/ASW-29	64.10	153.84	230.76	2564.00	102.56	153.84	448.70
AN/AYA-5	155.00	NR	NR	4175.00	NR	NR	1240.00
AN/AYA-10	355.74	853.76	1280.64	14294.40	569.18	853.76	2490.15
AN-3151-2	.26	.77	1.03	N/A	.51	.77	N/A
AN-3154-1A	.26	.77	1.03	N/A	.51	.77	N/A
AN-3533	1.09	2.06	3.91	68.13	1.74	2.60	78.40

4-4. Avionics Estimated Maintenance Cost Factors (CONT).

AVIONICS EQUIPMENT OR SYSTEM	ESTIMATED LABOR COST (\$)				ESTIMATED PARTS COST (\$)		
	ORG	FIELD	HEAVY	DEP	FIELD	HEAVY	DEP
AS-580A/ARN-30	.16	.38	.57	6.38	.26	.38	1.12
AS-1304/ARN	.72	1.73	2.60	21.25	1.16	1.73	2.00
AS-1520/APN-158	9.01	21.62	32.45	296.88	14.42	21.62	72.08
AS-1703/AR	.21	.50	.76	15.63	.34	.50	1.52
AS-1869/ARN	.99	2.38	3.56	39.60	1.58	2.38	6.93
AS-1870/ARN	1.44	3.46	5.18	57.60	2.30	3.46	10.08
AS-1922A/ARC	.40	.96	1.43	25.00	.64	.96	3.20
AS-2042/ARC	1.59	4.06	6.08	71.25	2.70	4.06	8.40
AS-2285/ARC	3.48	8.34	12.51	139.00	5.56	8.34	24.33
AT-134	N/A	N/A	N/A	N/A	N/A	N/A	N/A
AT-450()/ARC	.17	.40	.60	6.25	.26	.40	.80
AT-454/ARC	.62	1.48	2.22	24.13	.98	1.48	4.72
AT-640A/ARN	.38	.90	1.35	15.00	.60	.90	2.63
AT-701()/AR	.09	.22	.33	11.88	.15	.22	.92
AT-741/A	.14	NR	NR	41.76	NR	NR	7.31
AT-780/ARN	1.05	NR	NR	53.13	NR	NR	4.86
AT-805/ARN	.07	.17	.26	2.84	.11	.17	.50
AT-884()/APX	.14	.34	.50	34.00	.22	.34	2.04
AT-1108/ARC	.77	1.85	2.77	68.63	1.23	1.85	4.32
BB-432/A	.93	2.79	3.72	68.75	1.86	2.79	12.32
BB-433/A	1.55	4.65	6.20	62.50	3.10	4.65	6.56
BB-434/A	1.41	4.23	5.64	93.75	2.82	4.23	14.40
BB-641A/A	2.12	6.35	8.46	118.44	4.23	6.35	18.19

4-4. Avionics Estimated Maintenance Cost Factors (CONT).

AVIONICS EQUIPMENT OR SYSTEM	ESTIMATED LABOR COST (\$)				ESTIMATED PARTS COST (\$)		
	ORG	FIELD	HEAVY	DEP	FIELD	HEAVY	DEP
BB-649/A	1.62	4.86	6.48	90.72	3.24	4.86	13.93
BB-676/A	2.02	6.05	8.06	112.84	4.03	6.05	17.33
BB-678/A	2.25	6.75	9.00	126.00	4.50	6.75	19.35
C-1611()/AIC	1.58	3.78	5.67	102.63	2.52	3.78	8.45
C-4209/ARC	.16	.37	.56	46.25	.25	.37	5.00
C-6533()/ARC	1.00	2.40	3.60	50.00	1.60	2.40	13.00
C-7266/ASW-29	3.45	8.28	12.42	138.00	5.52	8.28	24.15
C-7269/ASW	.88	2.10	3.15	35.00	1.40	2.10	6.13
C-8157/ARC	7.00	N/A	N/A	51.88	N/A	N/A	12.00
C-8476/ASW	9.00	21.60	32.40	360.00	14.40	21.60	63.00
C-8477/ASW	6.00	18.00	27.00	300.00	12.00	18.00	52.50
C-8478/ASW	2.50	6.00	9.00	100.00	4.00	6.00	17.50
CD-4(ARC)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CN-405/ASN	2.63	6.30	9.45	78.13	4.20	6.30	1.68
CN-811()/ASN	7.48	17.95	26.93	574.38	11.97	17.95	20.00
CN-1072/AJN	.45	NR	NR	18.00	NR	NR	3.15
CN-1179/ASW	11.25	27.00	40.50	450.00	18.00	27.00	78.75
CN-1314()/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CN-1325/ASW	5.00	12.00	18.00	200.00	8.00	12.00	35.00
CU-435	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CU-942()/ARC-54	1.86	4.46	6.69	74.35	2.97	4.46	13.01
CU-991()/AR	5.93	14.22	21.33	423.75	9.48	14.22	60.52

4-4. Avionics Estimated Maintenance Cost Factors (CONT).

AVIONICS EQUIPMENT OR SYSTEM	ESTIMATED LABOR COST (\$)				ESTIMATED PARTS COST (\$)		
	ORG	FIELD	HEAVY	DEP	FIELD	HEAVY	DEP
CU-1658A/ARC	13.00	NR	NR	341.63	NR	NR	60.00
CU-1794()/ARC	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CU-1796()/ARC	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CU-1893()/ARC	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CY-1894()/ARC	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CV-1275()/ARN	2.72	6.52	9.77	204.75	4.34	6.52	75.89
DG-401	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DMN4-4.1	.41	.99	1.48	16.48	.66	.99	2.88
DT-309/AJN	4.75	NR	NR	190.00	NR	NR	33.25
DY-86/ARN-30	.28	.66	.99	16.00	.44	.66	1.90
F-726/AR	.16	.39	.58	23.75	.26	.39	1.52
H-101()/U	.38	.91	1.37	25.38	.61	.91	10.52
ID-48()/ARN	1.25	NR	NR	98.63	NR	NR	7.40
ID-250()/ARN	.82	NR	NR	77.63	NR	NR	13.00
ID-387/ARN	.27	NR	NR	10.60	NR	NR	1.86
ID-453/ARN-30	2.18	NR	NR	126.13	NR	NR	53.60
ID-637/ARN	.38	NR	NR	48.00	NR	NR	3.00
ID-663()/ARN	2.90	NR	NR	159.38	NR	NR	40.00
ID-718/ARN	1.04	NR	NR	114.88	NR	NR	8.52
ID-998()/ASN	7.78	NR	NR	140.25	NR	NR	49.03
ID-1347/ARN-82	1.75	NR	NR	118.13	NR	NR	26.79
ID-1351()/A	7.31	NR	NR	287.50	NR	NR	65.00
ID-1720/ASW	N/A	NR	NR	N/A	NR	NR	N/A

4-4. Avionics Estimated Maintenance Cost Factors (CONT).

AVIONICS EQUIPMENT OR SYSTEM	ESTIMATED LABOR COST (\$)				ESTIMATED PARTS COST (\$)		
	ORG	FIELD	HEAVY	DEP	FIELD	HEAVY	DEP
IN-14	N/A	NR	NR	N/A	NR	NR	N/A
J-2	7.00	NR	NR	661.11	NR	NR	100.91
KA-30A()	44.26	88.52	132.78	871.63	106.22	177.00	204.00
KA-60()	45.50	91.00	136.50	1625.00	109.20	182.00	600.00
KA-76()	.80	1.59	2.38	22.26	1.91	3.18	8.11
KIT-1A/TSEC	25.00	50.00	90.00	1000.00	40.00	100.00	175.00
KS-61A	125.00	250.00	375.00	4687.50	300.00	500.00	1625.00
KS-113()	N/A	N/A	N/A	N/A	N/A	N/A	N/A
LS-38()	106.93	213.86	320.79	1010.00	256.63	427.72	800.00
LS-59()	141.03	282.05	423.08	5312.50	338.46	564.10	1830.00
M-40A	.05	.11	.16	1.80	.07	.11	.32
MA-1()	38.98	93.54	140.31	1559.00	62.23	93.54	272.83
MC-1	2.95	NR	NR	94.25	NR	NR	26.00
MD-1()	4.89	NR	NR	661.63	NR	NR	58.80
MD-736/A	.75	1.80	2.70	39.38	1.20	1.80	9.00
MT-1142()/ARC	.03	.07	.11	1.20	.05	.07	N/A
MT-1719()/AR	.20	.47	.70	7.80	.31	.47	1.37
MT-2292/AR	.05	.12	.18	2.00	.08	.12	.35
MT-2641/ARC-94	.58	1.36	2.04	22.68	.91	1.36	3.97
MT-3772()/A	.18	.43	.65	7.20	.29	.43	1.26
MT-3802/ARC	.15	.36	.54	50.00	.24	.36	7.00
MX-1646/ARC	.11	.27	.41	45.38	.18	.27	.81
MX-8611/ASN	N/A	N/A	N/A	N/A	N/A	N/A	N/A

4-4. Avionics Estimated Maintenance Cost Factors (CONT).

AVIONICS EQUIPMENT OR SYSTEM	ESTIMATED LABOR COST (\$)				ESTIMATED PARTS COST (\$)		
	ORG	FIELD	HEAVY	DEP	FIELD	HEAVY	DEP
PP-2792/ARN-30D	.30	.72	1.08	64.50	.48	.72	15.70
PP-6508	1.33	3.18	4.77	53.00	2.12	3.18	9.28
PU-542()/A	1.31	3.15	4.72	108.75	2.10	3.15	17.04
PU-543()/A	1.09	2.06	3.91	68.13	1.74	2.60	121.81
PU-544()/A	2.29	5.50	8.24	81.38	3.66	5.50	36.40
PU-545()/A	3.18	7.63	11.45	116.88	5.09	7.63	6.50
R-509()/ARC	1.77	4.25	6.37	89.13	2.83	4.25	8.60
R-511/ARC	1.68	4.02	6.03	118.50	2.68	4.02	13.40
R-844()/ARN-58	7.00	16.80	25.20	454.63	11.20	16.80	56.00
R-1041()/ARN	.60	1.44	2.16	96.13	.96	1.44	9.33
SB-329/AR	.78	1.87	2.81	75.25	1.25	1.87	19.04
SI-07F	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SN-410()/ASW-29	.10	.25	.37	4.12	.16	.25	.72
SN-441/ASW	.38	.90	1.35	15.00	.60	.90	2.63
SN-442/ASW	8.00	19.20	28.80	320.00	12.80	19.20	56.00
T-366()/ARC	.72	1.73	2.59	160.63	1.15	1.73	12.85
T-611/ASN	.48	NR	NR	18.95	NR	NR	3.32
T-992/A	5.80	NR	NR	232.00	NR	NR	40.60
TS-1843/APX	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TSEC/KY-28	26.10	62.64	93.96	1044.00	41.76	62.64	18.27
TW-333/ASH-19	N/A	N/A	N/A	N/A	N/A	N/A	N/A

4-4. Avionics Estimated Maintenance Cost Factors (CONT).

N/A – Not Available As Of This Printing

NR – Maintenance And/Or Repair Parts Not Authorized At This Category

NOTE: Estimated maintenance cost factor for a given category of maintenance is based upon the total cost estimated to maintain an item and/or system for FY 1971 as amortized on a pro-rata basis for each of such items within the Army system for that year.

Source: ECOM (AMSEL-ST-AE)

4-5. Airborne Armament Maintenance Costs. 1/

Labor Cost <u>2/</u>					Parts Cost <u>3/</u>				
ACFT/WPN SUBSYSTEM	ORG MAINT	DS MAINT	GS MAINT	DEP MAINT	ORG MAINT	DS MAINT	GS MAINT	DEP MAINT	TOTAL MAINT COST
UH-1B/C M5	3,920	2,107	1,379	15,881	197	788	253	1,576	26,101
AH-1G M18A1	1,960	1,309	952	9,895	148	1,220	406	1,922	17,812
UH-1B/C/M M21	9,800	2,779	1,344	15,858	230	3,370	1,072	2,987	37,440
UH-1D/H M23	735	294	105	582	48	390	130	614	2,898
CH-47A/B/C M24	735	294	105	262	41	336	112	529	2,414
OH-6A OH-58A XM27E1	5,880	1,736	833	6,565	285	2,354	785	3,718	22,156
AH-1C M28A1	14,700	3,584	1,379	19,630	1,213	10,313	3,336	15,470	69,625
AH-1G XM28E1	14,700	3,584	1,379	19,630	1,213	10,313	3,336	15,470	69,625
AH-1G XM35	3,920	1,407	518	8,580	750	4,950	1,500	7,800	29,425
CH-47A/B/C XM41	735	294	105	593	43	180	66	257	2,273

Section IV. ARMAMENT COSTS

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4-5. Airborne Armament Maintenance Costs. 1/(CONT).

Labor Cost <u>2</u> /					Parts Cost <u>3</u> /				
ACFT/WPN SUBSYSTEM	ORG MAINT	DS MAINT	GS MAINT	DEP MAINT	ORG MAINT	DS MAINT	GS MAINT	DEP MAINT	TOTAL MAINT COST
UH-1D/H XM59	1,960	511	140	1,522	57	237	86	380	4,893
UH-1B/C/M XM156	980	252	126	2,340	31	255	85	402	4,471

1/—Maintenance costs are estimates because TM38-750 maintenance data has been waived for SEA.

2/—Labor costs are estimated Direct labor rates. Overhead rates not included.

3/—Parts costs are from engineering estimates. Consumption data not available.

Source: WECOM (AMSWE-SMM-AR)

CHAPTER 5

RESEARCH AND DEVELOPMENT OF MATERIEL

Army aviation research and development is conducted on aircraft systems and in areas not directly related to specific aircraft systems. Research not directly related to aircraft systems includes low speed aerodynamics, structures, and propulsion. Exploratory development is conducted in such areas as area fluid dynamics, aeromechanics, flight dynamics, flight loads, aircraft structures and composite materials, power devices, propulsion components, aircraft survivability, aircraft ground support equipment, reliability/maintainability, avionics technology, and aircraft weapons.

5-1. General.

a. Research aircraft are procured in limited quantities to evaluate concepts during the Research, Exploratory Development and Advanced Development phases of the R&D cycle.

b. Development aircraft systems are aircraft systems proposed for operational use to replace or complement current Army aircraft systems.

5-2. Research Aircraft Systems.**5-3. X-14B Vertical Take-off and Landing (VTOL) Research Aircraft.**

The X-14B is a vertical take-off and landing (VTOL) research aircraft employing the deflected jet principle. Built by Bell Aerosystems, it was modified as the X-14B by the Aircraft Division, Northrop Corporation and delivered to Ames Research Center in June 1970 for joint Army/NASA flight research. It is currently configured as a variable stability and control aircraft and is used in the development of new VTOL flight control systems in conjunction with flight simulation studies. Its hovering performance is achieved by tailpipe diverter mechanisms which rotate the engines' exhaust flow through a 70 degree angle. The X-14B has four flight control systems, two which are mechanically connected to stick and rudder pedals and two which are electronically controlled. The systems consist of conventional aerodynamic control surfaces, manually driven roll, pitch, and yaw reaction control nozzles utilizing engine bleed air, electronically

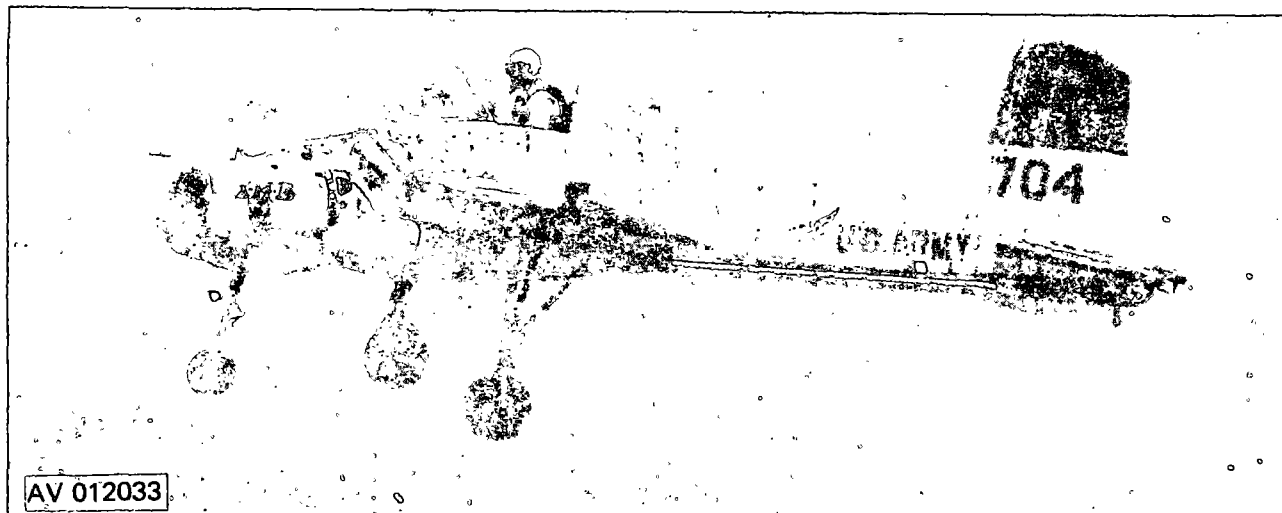


Figure 5-1. X-14B

controlled roll, pitch, and yaw nozzles, and the primary research or model mode. The model mode utilizes an on-board CP-2 digital computer to provide the variable stability and control characteristics. Reliability and redundancy of the control systems have made the X-14B a versatile research aircraft.

5-4. Dimensions and Data.

Length	25 ft 12 in
Wingspan	35 ft 10 in
Height	10 ft 8 in
Tread	10 ft 6 in
Maximum Gross Weight	4250 lb
Speed Range	15 knots rearward to 200 knots forward
Engines	2 YJ-85 turbojet; 2500 lb thrust
Landing Gear	Fixed main gear and nose wheel

5-5. Status.

The operational envelope of the X-14B is being defined prior to the aircraft's use as a flying simulator to develop and investigate VTOL flight control systems.

5-6. YOY-10A Rotating Cylinder Flap (RCF) Research Aircraft.

The YOY-10A Rotating Cylinder Flap (RCF) research aircraft is a highly modified version of the prototype North American Rockwell OV-10A Bronco. It was delivered to Ames Research Center, Moffett Field, California in April 1971 for a joint Army/NASA research program to investigate the rotating cylinder flap as a high lift device to improve short take-off and landing (STOL) performance. Major modifications include four 12-inch diameter cylinder sections immersed in the wing at the leading edge of the trailing edge flaps. These cylinders are hydraulically driven to increase the speed of the boundary layer air and turn the flow as much as 90 degrees over the flaps. Turning at high speeds (7600 RPM), the cylinders effectively delay flow separation and stall which allows lower approach and landing speeds. The propellers are four bladed, 9-foot, 5-inch diameter, fiberglass construction and are cross shafted to provide

single engine survivability at low airspeeds. Both the propellers and the cross shafting were derived from the CL-84 tilt wing research aircraft. Other major modifications include differential control of propeller pitch for improved roll control at low speeds and the installation of two T53-L-11 engines replacing the 660 shaft horsepower YT-76 engines previously installed.

5-7. Dimensions and Data.

Length	41 ft 6 in
Wingspan	34 ft
Height	15 ft 1 in
Tread	13 ft 10 in
Maximum Gross Weight	11,880 lb
Speed Range	50-200 knots
Engines	2 T53-L-11 turboshaft, 1100 SHP
Landing Gear	Fixed main gear and nose wheel
Escape System	LW-3B Rocket Seat

5-8. Status.

The aircraft has completed wind tunnel testing and has been flying since August 1971 to document the effectiveness of the rotating cylinder flap and to investigate the low speed handling qualities.

5-9. Model 347 Research Aircraft.

a. In January 1970, the U.S. Army bailed a CH-47A aircraft to the Vertol Division of the Boeing Company to investigate and demonstrate improved aircraft operating characteristics resulting from the application of advanced technology. The CH-47A aircraft was extensively modified and designated the Model 347. The major modifications were:

- (1) 110-inch extended fuselage
- (2) 30-inch extended aft pylon
- (3) Four bladed rotors
- (4) Uprated T55-11 engines

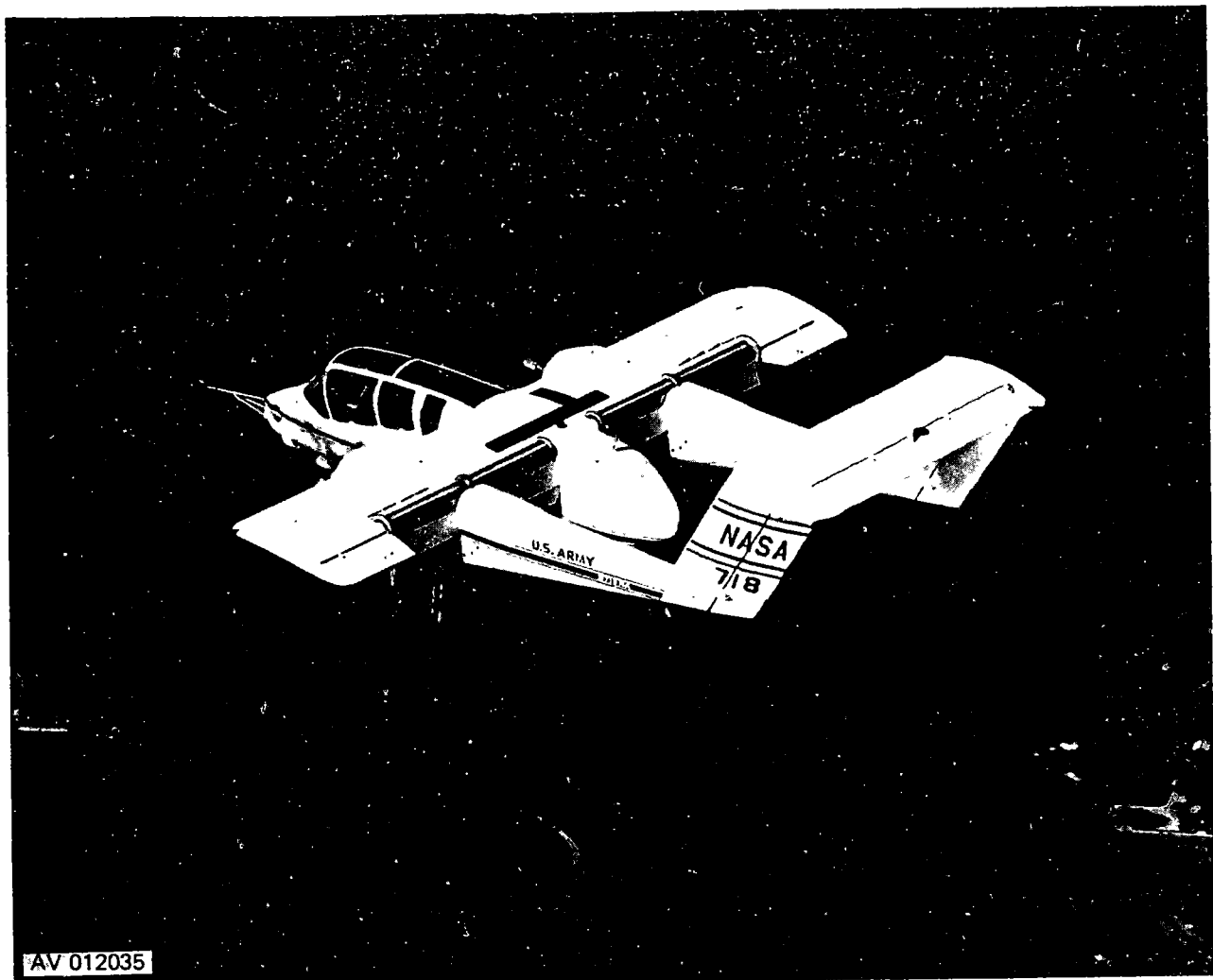


Figure 5-2. YOv-10A

(5) Up-rated CH-47C transmission

(6) Retractable landing gear

(7) Improved cockpit

(8) Structural tuning

(9) Vibration suppression

(10) Delta 3 flapping hinge — forward hub

(11) Advanced control system

b. In addition, the Model 347 included structural provisions for installation of a tilt wing to explore

winged helicopter operation, in level and maneuvering flight, during a second phase in the research program.

5-10. Characteristics.

Fuselage Length: 60.17 ft

Helicopter Design Gross Weight: 45,000 lbs

Helicopter Test Gross Weights: 35,400 lb to
46,000 lb
53,000 lb
(external load)

Empty Weight (helicopter): 29,000 lbs

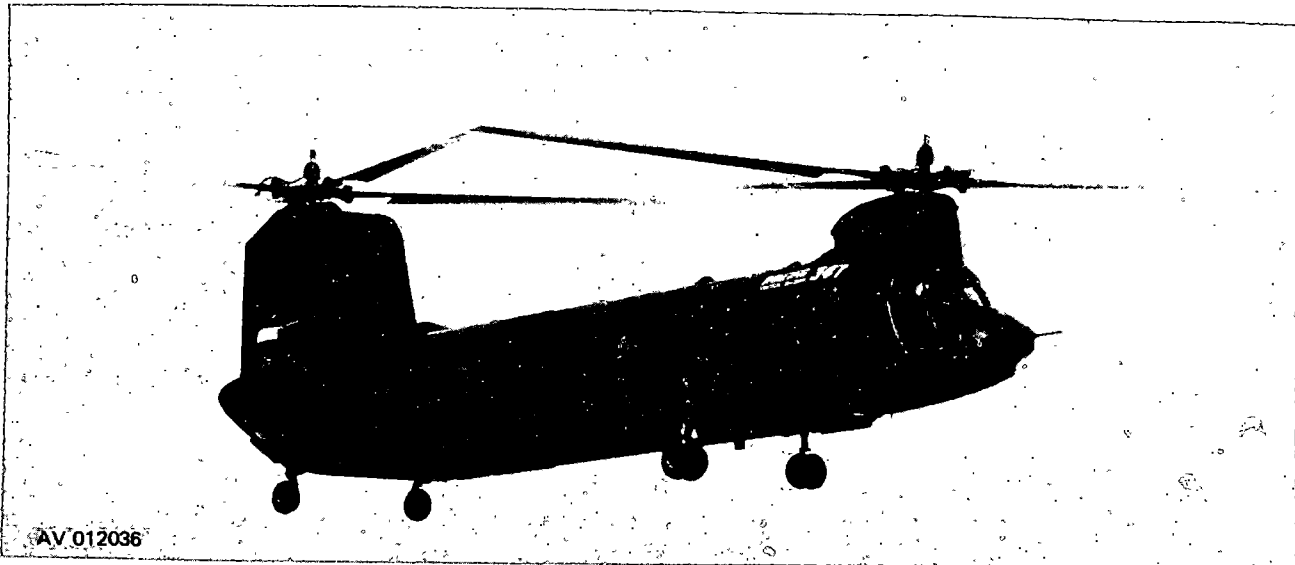


Figure 5-3. Model 347

Engines: (2) T55-L-11

Max Power (10 minutes) SL Std: 3925/engine

Rotor Diameter: 60 ft

Rotor Blade Chord: 25.25 in.

Wing Area: 300 sq ft
340 sq ft (w/carryover)

Wing Span: 45.2 ft

Aspect Ratio: 6

Wing Tilt Range: 10° down to 85° up

Maximum Airspeed (helicopter) = 177 knots (3000' HD)
(winged) = 170 knots (Est.)**5-11. Status.**

First flight of the Model 347 was on 27 May 1970. At completion of pure helicopter flight phase in August 1971, the Model 347 had flown 344 hours. First flight of the winged 347 was on 23 December 1971. The winged 347 has achieved a maximum flight speed of 163 knots. The flight test program is scheduled to be completed by 31 March 1972.

5-12. Development Aircraft Systems.

The following development aircraft systems are listed in order of priority.

5-13. Utility Tactical Transport Aircraft System (UTTAS).

The UTTAS is a VTOL aircraft proposed as the Army's first squad-carrying assault helicopter and UH-1 replacement.

5-14. Schedule.

QMR Approved	10 Feb 71
DCP Approved	22 Jun 71
MN(ED) Approved	29 Dec 71
Airframe Prototype Development Contract	30 Aug 72
First Flight	Sep 74
Complete Government Evaluation	Sep 76
APE/Advance Production	Sep 76
Production Decision & Award	Apr 77
Type Classified Standard A	Jun 78

5-15. Performance and Characteristics from the Material Need (ED) February 1972 Version.

Hover Out of Ground Effect (HOGE) – Design Gross Weight under zero wind 4000 ft, 95° F, and



Figure 5-4. Model 347

achieve 450-550 feet per minute (fpm) vertical climb at zero airspeed using not more than 95% military rated power (MRP).

Mission Endurance – 2.3 hours including a 30-minute fuel reserve.

Combat Payload – Internal (11 Troops) 2,640 lbs
 Combat Payload – External 7,000 lbs

Cruise Speed – 145-175 KTAS.

Reliability – Mission Abort and Flight Safety Probabilities of .986909 and .999952, respectively, of completing 1 hour mission.

Maintainability –

Fault Corrective Maint (thru GS)	2.8 MMH/FH
Inspections and Service	1.0 MMH/FH
Periodic Inspection (Interval)	300 Hrs
MTBR (Dynamic Components)	1500 Hrs
Airframe Overhaul (Interval)	4500 Hrs

Availability – 82% for 69 Hrs per Month Program.

.90 Probability of Re-establishing mission within 30 minutes (Orgn Type Failures).

Crew Three (3) (Pilot, Copilot, and Crewchief-Gunner).

Engine(s) – Two (2) T700-GE-700 (1500 SHP).

5-16. Heavy Lift Helicopter (HLH).

The HLH is being developed to provide the Army with a required increased payload capability above that available with existing CH-47C and CH-47B helicopters during the 1974-1985 time frame.

5-17. Schedule and Cost.

QMDO-Jul 69
 MN Approved-Apr 72
 MN (ED) Approved-Jun 75
 DSARC (ED)-Jun 76
 (Defense Systems Acquisition Review Council)

5-18. Desired Performance and Characteristics from Heavy Lift Helicopter ATCP RFQ Nov 70.

Hover Out of Ground Effect (HOGE) — Sea level, 95°F, zero power setting not to exceed military rated power (MRP).

Combat Payload — 22.5 tons

Range — Two 25-mile round trips

Crew — 4-5

Engine(s) — Three

APPENDIX A

REFERENCES

ARMY REGULATIONS (AR)

- 95-70 Army Aviation Planning Manual.
- 310-50 Authorized Abbreviations and Brevity Codes.
- 320-5 Dictionary of United States Army Terms.

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- 1-5 Army Aviation Organization and Employment.
- 1-100 Army Aviation Utilization.
- 1-105 Army Aviation Techniques and Procedures.
- 21-5 Military Training.
- 21-6 Techniques of Military Instructions.
- 21-30 Military Symbols.
- 21-60 Visual Signals.
- 55-15 Transportation Reference Data.
- 55-40 Army Combat Service Support Air Transport Operations.
- 57-35 Airmobile Operations.
- 101-10 Staff Officers' Field Manual: Organization, Technical, and Logistical Data (Part I – Unclassified).

TECHNICAL MANUALS (TM)

- 55-450-8 Air Transport of Supplies and Equipment: External-Transport Procedures.
- 55-450 series Air Transport of Supplies and Equipment: Internal-Transport Procedures.
- 55-1510 series Operator's Manual (Fixed Wing Aircraft).
- 55-1520 series Operator's Manual (Rotary Wing Aircraft).
- 55-450-15 Air Movement of Troops and Equipment (Non-Tactical).



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